



Review

The impact of digital technology on psychological treatments and their dissemination



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ABSTRACT

The psychological treatment of mental health problems is beginning to undergo a sea-change driven by the widespread availability of digital technology. In this paper we provide an overview of the developments to date and those in the pipeline. We describe the various uses of digital interventions and consider their likely impact on clinical practice, clinical services and the global dissemination of psychological treatments. We note the importance of online clinics, blended treatment, digital assessment and digital training.

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1. Introduction

The psychological treatment of mental health problems is beginning to undergo a fundamental change. This change is being driven by the widespread availability of “digital technology” by which we mean computers, the internet, mobile devices such as smartphones, and mobile software applications (apps). In this paper we describe the various uses of digital interventions and consider their likely impact on clinical practice, clinical services and the global dissemination of psychological treatments.¹

2. Digital treatment

There are well established digital treatments for depression and most of the anxiety disorders, and for problems such as insomnia (Andersson & Titov, 2014). The great majority are self-help programmes designed either to be used on their own or with some

form of support. These treatments vary markedly in their content, clinical range, format, functionality and mode of delivery.

2.1. Content

The majority of the digital treatments are forms of cognitive behaviour therapy (Andersson, 2014). Most have been derived from existing face-to-face treatments or from self-help books based upon them. Some are greatly simplified versions of the original treatment and are little more than collections of “tools”, whereas others retain both the treatment’s procedures and the strategies that govern their use. In general, the interventions make more use of behavioural than cognitive procedures and often there is a prominent educational component. Indeed, some interventions present themselves as educational programmes rather than treatments, and deliver the intervention in “lessons”, not “sessions”.

There are digital versions of other forms of psychotherapy including acceptance and commitment therapy (Pots et al., 2016), behavioural activation (Ly et al., 2014), interpersonal psychotherapy (Donker, et al., 2013a), mindfulness interventions (Spijkerman, Pots, & Bohlmeijer, 2016) and problem-solving therapy (Kleiboer et al., 2015). These adaptations have received less research attention than the cognitive behavioural ones. Like the cognitive behavioural interventions, they vary in the extent to which they retain the strategies and procedures of the original treatment.

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¹ Fifty years ago an equivalent sea-change began. The research methods of experimental psychology and clinical medicine began to be applied to the development and evaluation of psychological treatments. Among those who have contributed most to this revolution is G Terence (Terry) Wilson to whom this article is dedicated.

Truly novel digital treatments are few and far between. Examples include positive cognitive bias modification as a potential treatment for depression (Blackwell et al., 2015), virtual reality-based exposure in the treatment of anxiety disorders (Valmaggia, Latif, Kempton, & Rus-Calafell, 2016) and persecutory delusions (Freeman et al., 2016), and the use of robotic technology to improve social interaction in autism spectrum disorders and dementia (Riek, 2016). An example of an intervention that is still at the experimental stage is the use of a computer game to block the reconsolidation of intrusive traumatic memories (James et al., 2015).

2.2. Clinical range

The existing digital treatments differ in the breadth of psychopathology that they address. Most are disorder-specific but a few are even more precisely targeted such as one designed for people with suicidal thoughts (Van Spijker, Van Straten, & Kerkhof, 2014). Conversely, some are “transdiagnostic” in scope and have a broad clinical range (Craske et al., 2009; Titov et al., 2011). These have great potential clinical utility.

2.3. Format

The interventions vary in their format. Some retain that of the face-to-face treatment from which they were derived; for example, by having regular weekly sessions. (In digital treatments “sessions” are times set aside by the “user” (“patient”, “client”) to devote to the intervention.) Others modify the format to match the way that websites or apps are typically used (Ben-Zeev et al., 2015). Generally, this results in briefer, more frequent, sessions than in face-to-face treatment, and often the overall length of treatment is shorter.

The interventions also vary in their structure. Some are linear, progressively leading users through the intervention step-by-step, whereas others have a variety of modules which may be used with partial or total flexibility.

There may be a degree of personalisation (“tailoring”). In practice, this may amount to little more than matching the text and clinical examples to the user’s demographic group (e.g., middle-aged, female) although some interventions go further by incorporating algorithms that generate a treatment which matches aspects of the user’s psychopathology. These algorithms are either derived from the strategy inherent to the treatment or the recommendations of experienced clinicians. In the future machine learning may be used for this purpose (Abdullah et al., 2016).

An alternative to tailoring is allowing users to select components of the intervention that suit their particular concerns. For example, people with depression might choose modules on Worrying, Difficulty Sleeping and Improving Concentration, as well as ones on Low Mood and Negative Thinking. Whether this “pick and mix” approach leads to a better outcome than a clinician-led or algorithm-led approach needs to be determined. The answer may depend upon the type of psychopathology being addressed.

2.4. Functionality

The early digital interventions consisted of little more than text and thus resembled printed self-help programmes. This is changing. More attention is being given to their appearance, appeal and ease of navigation, and the interventions may include features such as learning exercises, self-monitoring tools, progress reports, downloadable documents, audio- and video-files, audio- and video-feedback, avatars, quizzes and games. Examples of multifaceted and technologically sophisticated interventions are recent ones for social anxiety disorder (Stott et al., 2013) and post-

traumatic disorder (Wild et al., 2016). A few interventions have been delivered entirely in the form of a game (Merry et al., 2012), a modality that may especially suit younger users and is attracting considerable interest.

Two innovations are likely to gain ground in the near future. The first is the use of virtual reality-based procedures as the equipment required is becoming more readily available, and the second is artificial intelligence-informed communication with the user.

2.5. Mode of delivery

A major way in which the interventions differ is in their mode of delivery. Most are delivered via websites and can be accessed on a wide range of devices, although some are not suitable for viewing on the small screen of the typical smartphone. Others are app-based and have been designed with smartphones in mind (Donker, et al., 2013b). Whether interventions are website-based or app-based has an influence on the form that they can take and the functions that can be used. Certain interventions employ both modes of delivery; for example, a website-based intervention may have an accompanying app for purposes such as self-monitoring or planning ahead.

3. Digital assessment

Digital technology provides new means of assessing and tracking psychopathology. At the simplest level, it can improve both the administration and interpretation of assessment questionnaires which, until recently, have been largely in pencil-and-paper format and manually scored. Many questionnaires are now available in digital form and can be completed via a website or app. This allows them to be automatically scored and interpreted with reference to established norms, and in some instances the scores can be transmitted directly to the clinician, the user and the user’s clinical record.

The psychometric performance of digital questionnaires is a matter of concern as their presentation often differs from that of the source instrument. Overall, their performance appears to be similar to that of their pencil-and-paper counterparts but exceptions have been found (Alfonsson, Maathz, & Hursti, 2014; van Ballegoijen, Riper, Cuijpers, van Oppen, & Smit, 2016). Little is known about the performance of app-based questionnaires. Some degree of standardisation of digital questionnaires seems desirable, perhaps by instrument developers creating “approved” digital versions, ones which have a consistent presentation across different devices.

Digital technology opens up new modes of assessment. Virtual reality procedures can assess sensitivity to particular environments (Freeman, 2008) and the presence of sensors in smartphones makes it possible to track many phenomena on an ongoing basis including sleep, movement, physical activity, speech, device usage and the person’s location (Abdullah et al., 2016; Saeb et al., 2015). How to use this information is only just beginning to be explored. It may prove possible to catch new episodes at a very early stage and supply interventions at the very time that users might benefit most (Faurholt-Jepsen et al., 2014). “Real time” intervention might be especially relevant to suicide prevention if markers of imminent risk could be identified (Christensen, Cuijpers, & Reynolds, 2016). However, psychopathology tracking is not necessarily benign. It can magnify rumination and self-focus, and it has been reported to trigger emotional instability (Murnane et al., 2016). Similarly, the immediate delivery of interventions might create reliance upon them which could interfere with the acquisition of self-management skills.

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