

Digital health interventions for the young: meeting expectations?

By Dr. Jessica K Edwards

The number of digital health interventions for mental health disorders is increasing, but research from Chris Hollis and colleagues suggests that the clinical benefits and cost-effectiveness are unclear. Consistent methods of reporting and evaluation are required to extract definitive conclusions from clinical trials.

The enthusiasm of children and young people (CYP) towards digital technology has spurred the rapid development of digital health interventions (DHIs) for this age group. For mental health disorders, DHIs have the potential to reach CYP at a relatively low cost, through a medium that is presumed accessible and familiar, whilst helping overcome access barriers to treatment. However, whether the proposed benefits of DHIs are truly realised is unclear. Now, a comprehensive review of the literature has found that DHIs have some clinical benefit for those with depression and anxiety but evidence supporting their use in attention deficit hyperactivity disorder (ADHD), autism spectrum disorders (ASD), psychosis and eating disorders is lacking.

In a review paper published in the *Journal of Child Psychology and Psychiatry*, Chris Hollis and his colleagues at the University of Nottingham, University College London and the Warneford Hospital, Oxford assessed the evidence for clinical benefit and cost-effectiveness of DHIs used by CYP with mental health problems, by synthesising data from previous reviews (meta-review) and providing an updated systematic review of randomised controlled trials (RCTs). Their meta-review included 21 articles, containing data from 190 trials of ~147 different DHIs. Their systematic review included 30 RCTs for DHIs aimed at improving outcomes in ADHD, ASD, psychosis, anxiety, depression, anxiety and depression, eating disorders and PTSD and depression, which between them randomised >5,000 participants.





Ref: Hollis, C., Falconer, C. J., Martin, J. L., Whittington, C., Stockton, S., Glazebrook, C., Davies, E. B. (2017), Digital health interventions for children and young people with mental health problems – a systematic and meta-review. J Child Psychol Psychiatr, 58: 474-503. doi: 10.1111/jcpp.12663

According to their analyses, depression and anxiety are the most common clinical targets for DHIs used by CYP, with the majority of these DHIs using an online, “sessional” computerised cognitive behavioural therapy (cCBT) format. In fact, cCBT achieved the strongest evidence of clinical effectiveness for depression and anxiety in adolescents and young adults. However, Hollis et al note that cCBT is limited by its “sit-down approach to treatment” and that it fails to exploit the full capabilities of modern digital technologies. “MobileType”, however, is one DHI that does exploit the “ubiquitous nature of mobile technologies”, using a momentary sampling approach to assess mood, stress, current activity, alcohol and cannabis use. The researchers propose that although not therapeutic, this type of utility may help personalise DHIs and support adherence. Conversely, Hollis et al found that self-guided interventions, such as “MoodGYM”, tend to achieve poor uptake and adherence. Finally, the researchers found no studies of DHIs for CYP with depression and anxiety that included data on cost-effectiveness.

The effectiveness of DHIs for ADHD in CYP was not assessed in any of the included studies. Three main interventions were identified: electroencephalogram (EEG)-based neurofeedback training (NFT), executive functioning training (EFT) and working memory training (WMT). EEG-NFT aims to decrease theta brain-wave activity and increase beta wave activity, while WMT and EFT aim to improve deficits in cognitive function and attention. Inconsistent results were reported for these interventions, with no overall differences found between the DHI and active placebo intervention group. From their updated systematic review, Hollis et al confirm that these DHIs cannot yet be recommended for ADHD treatment and conclude that “given that face-to-face nonpharmacological interventions for ADHD have not demonstrated efficacy, it is perhaps not surprising that digital versions would also not be effective”.

The DHIs for ASD typically use a computer game-based format designed for

preadolescent children and aim to improve on core deficits in social understanding, empathy and emotional recognition. Unfortunately, trials have not yet demonstrated a beneficial transfer of skills out of the “game” context to affect core ASD symptoms. Hollis et al propose that DHIs that focus on associated symptoms and behaviours in ASD, such as anxiety, may be more amenable to intervention than those that focus on the core deficits.

According to Hollis et al, various issues should now be addressed to maximise the potential, adherence and clinical benefit of DHIs in the mental-health setting. DHIs have the potential to deliver effective interventions on a wide scale at minimal cost relative to traditional therapies; it is therefore noted by the researchers that lack of data on their cost-effectiveness is “surprising given the promise that DHIs can increase health service efficiency”. Estimations of cost seem to be complex, requiring considerations of human support, the location where the DHI is delivered and the ownership of the DHI (i.e. whether DHIs are commercialised or free-to-use). Hollis et al emphasise that DHI sustainability and cost-effectiveness should be considered at the outset of DHI development and that “the development phase for a DHI should include consideration of the long-term costs of maintenance and updating, how these costs could be met and who will take responsibility for them”.

As well as cost implications, human support also compounds a key benefit of DHIs —automated delivery. Hollis et al found that the level of human support is poorly specified in many of the studies analysed. There is wide variation as to who provides the support, and the amount, its purpose and uniqueness. Further studies that address the benefits of human support on adherence and outcomes of DHIs in CYP are needed. The researchers suggest that human support may not necessarily be delivered by an actual person, but that “virtual human agents” could be a possibility in next generation DHIs.

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