ual is included in the trial report; b) there is an explicit offer to make the exact manual available from the authors (with their e-mail address included), or c) the manual is available online so that it can be found without difficulties by searching its name. With respect to the last option, a search was undertaken by entering the name of the programme or the reference in Google search engine. A full version of the manual had to come up within the first 30 hits.

In 19 of the 27 trials, a manual was mentioned in the text of the report, while in the remaining eight there was no mention of the existence of a manual.

Focusing on the 19 trials for which a manual was mentioned, there were eight manuals that were referenced in the paper's bibliography. Six of the references were for the generic manual adapted for the study, while only two were citations of the exact manual used. Of the remaining 11 studies in which a manual was not referenced in the bibliography, six cited another paper as source for the manual but, when searched, that paper did not cite the manual. Four of 11 cited another paper that, when searched, cited a generic manual in the bibliography. Finally, one study cited another paper that, when searched, cited in turn a further paper that, when searched, revealed no citation for the manual. A flow chart summarizing these findings is available upon request.

When we investigated open access to psychological treatment manuals, no study was found to provide a direct weblink. Seven manuals could be found when using a Google search (of which six were generic and only one[6] was the exact manual used). Only in one study[7], access to the exact manual was offered via e-mail from the authors. Thus, out of 27 trials, a total of only two (7%) exact treatment manuals could be identified that met our definition of open access.

In summary, only two studies (7%) reporting results of a psychological treatment for common mental disorders in LMICs provided citations to the exact manual used in the study, and only two (7%) provided open access to the manual.

Access to treatment manuals for psychological interventions is important for the replication and independent scrutiny of study results and for the dissemination of effective interventions.

Change is not only needed but also feasible. For example, two relevant RCTs of psychological treatments were released around the same time of the systematic review[3] and were thus not included in our analyses. One included a reference to an online version of the exact manual used[8], and the other offered access to a linked training programme to learn the intervention[9].

Accessibility to treatment manuals is a key aspect of open science of psychological treatments. Mental health journals and research funders should consider setting up mechanisms that require authors of RCTs to make the psychological treatment manuals they used open access.

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Three questions to consider before developing a mental health app

Most people with mental health problems do not access treatment, and the world does not have enough mental health clinicians to fill this treatment gap. Recently, many scholars have argued that technology-based interventions have the potential to reduce the treatment gap[1].

As smartphone ownership is becoming nearly ubiquitous around the world, interventions delivered through smartphone applications have received particular attention. Additionally, recent meta-analytic findings suggest that smartphone-based interventions are effective for a variety of common mental health problems[2]. This growing enthusiasm has led many academic researchers, non-profit organizations, and companies to create their own mental health applications (MH apps). Indeed, there are over 10,000 commercially available MH apps, and new apps are being released at an increasing rate[3].

Given the clear potential of MH apps, it is not surprising that many teams are investing substantial time and resources to develop new ones. However, it is important to consider recent evidence suggesting that the reach and impact of most new MH apps is limited, with most engaging few users[4,5].

Here, we propose that the proliferation of new MH apps is often unnecessary, sometimes counterproductive, and often redundant with apps that already exist. We pose three questions that people should consider prior to developing a new MH app. We also present alternative options that can often meet the needs that new MH apps are meant to address.

The first question calls for a thorough examination of alternatives that are already available. In many cases, it is likely that existing apps are sufficient to meet the needs of users. Recent evidence shows that many publicly available apps include a variety of evidence-based practices – for instance, in the case of depression and anxiety apps, cognitive restructuring, behavioral activation,

self-monitoring, and mindfulness[6].

In many cases, researchers may benefit from using these publicly available apps rather than spending time and money "reinventing the wheel". In addition, several of these apps have demonstrated that they are able to attract users and keep them engaged, a significant accomplishment that a new app might have difficulty matching.

Many options exist to help investigators identify existing apps efficiently. These include analyses of the treatment content within publicly available apps[6], expert reviews of publicly available apps[7], and evaluation tools from professional societies such as the Anxiety and Depression Association of America (https://adaa.org/finding-help/mobile-apps) and the American Psychiatric Association (https://www.psychiatry.org/psychiatrists/practice/mental-health-apps).

To supplement these resources, investigators can conduct their own searches of app stores. Generally, the most engaging apps in a given category will appear in the first few search hits. Given that engagement is one of the greatest challenges in digital mental health, using apps that are already known to engage users is an advantage that cannot be overstated.

With this in mind, there are some specific cases in which new apps would be valuable. For example, in a recent review of publicly available apps for depression and anxiety, many apps included relaxation and meditation, yet only two apps included exposure, and none included problem solving[6]. Thus, while creating new MH apps may not be necessary for the majority of treatment elements, there are some important evidence-based techniques for which developing new MH apps is warranted.

In the event that available MH apps do not provide a suitable alternative, the next consideration involves thinking critically about an engagement plan. One takeaway from digital mental health research is that engaging users is extremely difficult. Dropout rates reported in trials of digital interventions tend to be high, and engagement outcomes are even worse outside the context of controlled trials[4]. For instance, over 90% of users discontinue using MH apps within a week of installation[4].

Furthermore, MH app developers often need to compete in a highly saturated market. Recent research suggests that the top three MH apps account for about 90% of active users, leaving most apps with zero active users[5]. These top apps generally have large teams of product designers, human-computer interaction specialists, programmers, marketers and advertisers. Indeed, performing adequate user testing often involves years of work by large interdisciplinary teams, requiring substantial financial resources[8].

Additionally, as a practical consideration, commercial apps must be regularly updated in order to maintain usability after updates to iOS and Android platforms, not to mention upgrading to maintain user appeal in a crowded market. This means that app developers need to plan and budget for regular updates and upgrades in order to stay competitive.

In many cases, investigators will lack sufficient resources or expertise to attract and retain users simply by releasing an app on the app store. Instead, alternative strategies (e.g., receiving referrals from medical centers) may be necessary to attract and retain users. In the absence of these plans, releasing a new MH app may be an unnecessary addition to an already crowded marketplace.

The third consideration is whether a smartphone app is the best digital platform to implement an idea. Sometimes, the purpose of app development is not to attract and retain thousands of users but rather to study a research question involving technology.

Developing a smartphone app may be unnecessary in these instances. Several online platforms (e.g., Qualtrics, jsPsych) can help people develop and disseminate web-based surveys and interventions. Web-based alternatives are generally cheaper to develop, easier to adapt, and more useful for prototyping. Additionally, tools and interventions created on such platforms are often sufficient to engage participants in the context of lab-based experiments and even interventions. As an example, a single-session (30 min) web-based intervention developed on Qualtrics was shown to reduce youth depressive and anxiety symptoms[9].

With this in mind, mobile apps have some important advantages over web-based platforms in specific circumstances. For instance, mobile apps may be useful for studies involving real-time sampling, the collection of passive smartphone data, reminders or notifications, and research designs that require instant communication with participants. However, outside the context of these specific cases, web-based platforms offer cheaper options that are easier to refine.

In conclusion, the perceived advantages of MH apps have led to enormous enthusiasm and considerable funding for the creation of new apps. However, given the wide array of competing MH apps, the challenge of attracting and retaining users, and the utility of web-based alternatives, we advise caution. A thorough consideration of the above-mentioned questions will lead many to conclude that a new MH app is not a worthwhile investment. Resources may be better spent to advance other key priorities in digital mental health, such as evaluating the effectiveness of existing interventions, determining for whom these interventions are helpful, and experimentally testing strategies to improve engagement.

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