

## App'd to Fail: Mobile Health Treatments Fall Short in First Full Checkup

Early trials using mobile technology including text messaging and apps lack rigor and show mixed results

By Lucas Laursen | Tuesday, January 29, 2013

Health care via mobile technology is still in its infancy. Of 75 trials in which patients used mobile tech, such as text messaging and downloadable apps, to manage a disease or adopt healthier behaviors, only three showed reliable signs of success, according to a systematic survey. In an accompanying survey of medical personnel who used smart phones and other devices, to help deliver care, the same team found more success: 11 of 42 trials had positive, reliable results.

Yet mobile device-aided health care, called mHealth, attracts a lot of attention and dollars, as U.S. National Institutes of Health director Francis Collins wrote last year in *Scientific American*. In 2012 venture capital firms invested more than \$900 million in mHealth, according to a report by Mobile Health Market News.

“There’s a lot of enthusiasm for [mHealth] but [its effectiveness] wasn’t very clear,” says epidemiologist Caroline Free of the London School of Hygiene and Tropical Medicine in England, the lead author of the reviews. In 2011, for example, the World Health Organization found that only 12 percent of mobile health initiatives included an evaluation.

So Free and colleagues conducted the reviews, which appear in *PLoS Medicine*, she says, to “put us in the position of knowing exactly in which areas there was good evidence where the evidence was promising.” That information could help investors and researchers make better decisions about how to identify, improve and promote the best mobile health treatments.

In the first review, the team identified 334 relevant mHealth trials in seven medical databases. Most of the trials used text messaging to interact with patients, although some interacted through dedicated applications, downloadable audio and video or the Web. Only 75 of those trials included a control group, which allows researchers to compare experimental interventions with doing nothing.

Of the 75 controlled trials, 26 sought to change patient behavior by methods that included increasing exercise and 49 sought to help patients manage diseases medically such as by taking pills on time. That may not seem like many studies, but medical doctor Rahul Chakrabarti at Monash University in Australia, co-editor of the *Journal of Mobile Technology in Medicine*, calls it the most comprehensive meta-analysis of mHealth evidence to date.

The bad news is that most trials had weak designs, such as failing to randomize participants in the control group and the experimental group. Others relied on participants to self-report the results, but such methods can be unreliable. Free says such trials should use biochemical tests, instead. In some cases, it’s too early to tell whether a result, such as smaller waist size, would last long enough to improve participants’ health. Most trials also neglected the developing world, where mobile phones have the most potential to improve access to health care. “This does not undermine the outcomes,” Chakrabarti says, “but shows that going forward, there is a clear need for improved methodology.”



SMS messages in Africa provide reminders to patients to take antiretroviral drugs, reducing HIV virus counts.

Image: Flickr/The Reboot

ADVERTISEMENT

An advertisement for Scientific American Travel. The top part shows a traditional Chinese building with a red facade and a green roof, surrounded by trees. Below the image is a dark green banner with the text "SCIENTIFIC AMERICAN Travel" in white and yellow. Underneath that is another dark green banner with the text "To see our upcoming destinations" in white, and a button that says "CLICK HERE" in white on a dark green background.

There were a few promising, reliable trials: For instance, receiving text messages helped smokers quit in one trial that did verify its results with biochemical tests. Reminders also helped diabetics stick to their treatments in another trial. In the only successful developing-world trial, in Kenya, SMS reminders to take antiretroviral drugs helped reduce HIV virus counts.

The limitations of today's mHealth treatments should not discourage researchers, Free says, because people can learn from interventions that did work. For instance, in some of the trials in Free's second review, mobile phones helped doctors and nurses communicate with one another and with patients. But mobile phone cameras turned out to be bad for making remote diagnoses.

"We're at an exciting time right now and these reviews are in some ways catalyzing much greater discussion within the community to take a harder look at the evidence for mHealth," says Patricia Mechael, executive director of the mHealth Alliance in Washington, D.C.

Chakrabarti says one challenge for the field will be to conduct studies in locations with a bigger impact. A successful trial in the U.K. may not translate in the developing world due to different regulations, culture or infrastructure. So there should be more mHealth trials in low- and middle-income countries, he says, and their designers need to use to the highest standard of evidence. He adds, "It has the potential to break down many barriers to access."

## TRY A RISK-FREE ISSUE

**YES!** Send me a free issue of Scientific American with no obligation to continue the subscription. If I like it, I will be billed for the one-year subscription.



Email Address

Name