Healthcare apps

Richard Hays

In my clinical practice, patients often show me information that comes from some form of self-monitoring device and computer technology, generally known as 'apps' (applications). As an 'early adopter' of technology, I find this trend to be interesting, but also relatively unguided, except by marketing material. For my professional development, I set out to learn more about how I can use apps to improve my clinical practice. I did so by attending a Royal Society of Medicine meeting in April 2016 in London, and then conducting a literature search on this topic.[1] Here is a summary of the key current issues that I found needed to be considered when discussing healthcare apps with patients.

A mobile app is defined as 'a software application downloaded by a user to a mobile device'.[2] The development of apps has been rapid and society is becoming increasingly dependent on touching screens and entering a few keystrokes for communication, making reservations and shopping. The potential market for app usage is huge – about 75% of the world's population have mobile phones and 40% have internet access.[3,4]

The 'health and wellbeing' industry is growing rapidly, as ageing, health-aware populations seek information to guide lifestyle choices and healthcare interventions. Software developers have noticed this rapid growth and there are currently around 160,000 health and wellbeing apps available, including those available on multiple operating systems.

There is enormous potential in using apps to improve healthcare by providing 'real-time' information between consultations. However, most apps come at cost, even if modest, potentially limiting access for those most in need. Wearable technology facilitates monitoring physical activity, sleep patterns, dietary intake and other data. Humans are often enticed by 'gamification' (applying elements of game playing, usually online) and strive to achieve 'levels' and 'rewards'.[5] Why not make healthy living fun and rewarding by emulating frequent shopper and frequent flyer schemes? For example, 'platinum' level management compliance could boost self-esteem and provide access to discounts on healthy products.

A major concern regarding the growth in the number of apps is that while many claim health benefits, relatively few have been formally evaluated and even fewer have been proven to provide benefits.[6] Most have novelty value, but boredom follows. Some apps have not been shown to work; for example, a game encouraging greater physical activity by running from monsters might be fun, but an increase in the level of exercise is unproven.[7] A few apps have been shown to be harmful, such as apps to reduce alcohol consumption in adolescents (binge drinking may have increased)[8] and diagnosing melanoma from 'selfie' skin lesion images (low sensitivity and specificity).[9] Evaluation methodology for apps is still under development, where safety and effectiveness should be the priorities. However, there is currently no 'gold standard' for effectiveness.

Many apps potentially allow breaches of confidentiality as personal data are sometimes transmitted without encryption or even on-sold for marketing purposes.[10] From a user's perspective, confusion reigns because there are so many apps with so little reliable information about their effectiveness or risks.

One reason for the variation in quality is that app development is regulated differently across national borders, yet internet access is borderless. Until legal frameworks, regulation and quality assurance improve, app purchases may be risky because of potentially significant differences in the interpretation of consent, confidentiality, rights of children (dependent on age), access, rights to withdraw use and ownership of 'added-value' products.

To achieve behavioural change, apps require software engineering, design expertise, and behavioural science guidance to incorporate the principles of behavioural change.[11] Apps should challenge habits (action planning), beliefs (consequences) and perceived time constraints (problem solving to prioritise). Personalisation is important because 'becoming part of the game' increases motivation and participation. Follow-up with tailored, interactive support (eg short messaging service [SMS]) increases effectiveness, particularly for mental health apps. Certain approaches may be more effective with different age groups or cultures. Individual apps risk becoming outdated quickly, so automatic updates or 'use-by-date' self-destruction are thought to be desirable features.

Simpler apps that facilitate making doctors' appointments and encourage physical fitness are now common, but the emphasis is shifting towards chronic, complex disease management, where apps may have the greatest value. Current priorities in app development include risk reduction (eg weight, diet, smoking, alcohol), monitoring chronic disease (eg blood pressure, diabetes, lipids, dietary clashes), mental health (eg online cognitive behavioural therapy [CBT]) and encouraging compliance (teenagers with cancer), with promising early results.[12–14] In particular, mental health apps appear to reduce delivery cost and increase effectiveness by providing support between fewer personal contact sessions,[15] although patient resistance to revealing personal information has been reported (eg resulting in the closure of one UK psychological support service).[16]

New technology should be embraced as we work in partnership with patients to achieve better health outcomes. However, until proven safe and effective, some scepticism may be warranted about data accuracy and developers' claims. There may be a need for central oversight, guidance and even Pharmaceutical Benefits Scheme style subsidisation to guide consumers and professionals.

Author

Richard Hays MBBS, PhD, MD, FRACGP, FACRRM, FRCGP, Professor of Medical Education, University of Tasmania, Hobart, TAS. richard.hays@utas.edu.au

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