MHEALTH: MOBILE TECHNOLOGY MEETS MENTAL HEALTH, THE FUTURE IS NOW.

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Abstract
EHealth is an established concept within healthcare. More recently, the widespread adoption of smart phones and mobile devices among the population at large has shifted eHealth towards Mobile Health going forward. Now known as mHealth, it is a term used to describe mobile applications (apps) specifically built to promote medical and public health practice on mobile phones, tablets, or patient monitoring devices (WHO 2011). This article covers aspects of mHealth, in particular those related to Mental Health. It explores the potential risks/rewards of technology and asks questions about where we are heading and about technological advances outpacing policies concerned with the delivery of eHealth and mHealth.

Article
The Royal College of Nurses (RCN 2014) defines eHealth as "concerned with promoting, empowering and facilitating health and wellbeing with individuals, families and communities, and the enhancement of professional practice through the use of information management and information and communication technology."

The Healthcare Quality Strategy for NHS Scotland (2010) has identified eHealth as being vital in delivering the highest quality healthcare service. Mobile applications are expanding at an exponential rate. In June of this year, Apple Inc. announced that its iOS App Store had reached 1.2 million applications; this is comparable to Google Play (Perez 2014). The number of these relating to healthcare is also remarkable and was recently estimated to be around 100,000.

Former UK Health Secretary Andrew Lansley was reported (Roberts 2012) as saying that he wants the use of health apps to be as normal as using news and train apps, however the current reality is much different. The NHS has so far produced only a small number of apps and very few of these have been mental health related. This seems to be in stark contrast to policy drivers such as Scotland's Vision 2020 (NHS Scotland 2013). One of its objectives is that by exploiting mobile and smart technology Scotland will be recognised internationally by 2020 as a leader in digitally enabled health care.

One reason for this disparity is that new mHealth projects must appeal for funds to clinical commissioning groups and insurers. Even if funding is granted, several mobile app developers are on record as saying that the NHS commissioning model is not fit for purpose when it comes to the development of mental health apps (Evenstad 2014). Reliability is a

crucial concern for this fledgling industry. Some applications are poorly designed, based on inaccurate information or are simply fraudulent in nature (Diana 2014). If health care apps do not use content that is based on evidence and continuously updated then this can have potentially disastrous consequences for their users (Brown 2014; Haffey, Brady and Maxwell 2013).

Currently the US is leading on the regulation of mobile medical apps market (Phillips and Thornbory 2014). The US Food and Drugs Agency regard Mobile Health Apps as Medical devices; something that the UK government has as yet to do. Without such legislation in the UK, the enforcement of clinical and ethical standards is therefore very difficult. NHS Choices is entrusted with the review of health care apps for people in England. Its remit is to ensure that the information used within them is from a trusted source, that it complies with data protection laws and, most importantly, is clinically safe. However, this vetting process is not compulsory, and it only covers a small percentage of healthcare apps. Applications that pass the test simply get a seal of approval and go on to the "Health Apps Library" database.

Other challenges faced in promoting mental health apps include a lack of knowledge by the user; a lack of required technology; and the NHS mobile application privacy policy (NHS Fleet Solutions 2014) which makes it difficult to design apps that meet its strict criteria.

Confidentiality is a core issue in the expansion of mHealth. As gadgets take up more space in our daily lives they also become more invasive; some would say insidiously so. The recent hacking of icloud accounts, in which celebrities had private photos stolen, proves the vulnerability that technology users face. And what is more private than your health information? The use of passwords and encryption for security only goes part of the way in addressing this problem. App software produced in the private sector poses a particular risk to patient confidentiality. Many software developers use their apps to gather and send user information about an individual's username and password, age, gender and location. A study by Thurm & Kane (2010) found that 55% of apps tested had sent some of this information to other companies. Yet, despite these factors, six in ten clinicians and payers (NHS, insurers and private payers) believe that the widespread adoption of mHealth is inevitable in the near future (Economist Intelligence Unit cited by PriceWaterhouseCoopers 2012).

There are still many success stories. A good example is an app called "Crisis Card" released by the Cambridgeshire and Peterborough Clinical Commissioning Group (2014). 'Crisis Card' addresses mood management and crisis care specific to individual and provides them with advice and signposting designed to enable them to self-manage both their physical and mental health needs. Unfortunately, because the main function of the app is to signpost to relevant local support services, is not viable outside the local area it was designed for.

It is interesting to note that patients in developing countries are more likely to use mHealth applications than those in developed countries. A

possible reason for this is in the countries where existing local infrastructure is still not well established (PriceWaterhourCoopers 2012) and individuals can overcome this limitation by using an electronic information source. The advent of smart phones and modern technology has brought about a quantum leap in the need for information. The consequent demand for change, which has led to a reduction in historically established interests, slows down the advent and adoption of new innovations.

The European Commission (2014) and World Health Organization (2011) have produced mHealth specific publications. They explore numerous advantages of this field, such as:

- Boosting access to primary care.
- More accurate diagnostic treatment.
- More personalised care.
- Long term significant cost savings.
- Patients become participatory in their care instead of passive.
- Aids staff to feel supported and engaged.
- Improves and innovates practice.
- Provides more personalised care.

MHealth not only consists of applications to support patients to promote their own wellbeing, but also includes systems that allow health professionals to do their jobs more efficiently. Information apps such as the British National Formulary or guidelines from NICE and SIGN are already available but their use is limited. There is still a stigma in the usage of mobile phones at work and some work places may deem it as unacceptable to access your phone. However, the expansion of 3G and 4G make using emails, diary access and now mHealth viable reasons to do so. For example, some clinical commissioning groups such as NHS West Lancashire (2013) have even made it policy that, as long as certain criteria are met, staff can use their personal mobile device for work purposes. One of these conditions is that staff members agree to their mobile phone being fitted with the facility to "remote wipe" the device.

A review of eHealth conducted by Luxton, Sirotin and Mishkind (2010) looked at the safety issues around delivering mental health care through an unsupervised setting. The findings of their review provided evidence that mental health care can be safely delivered with eHeatlh resources to non-traditional locations. However, literature on this subject is limited and more research into the field would give a clearer representation.

As mHealth expands, will its use and application continue to divide opinion? The advantages are numerous and obvious, but the risks cannot be ignored. Professionals must not allow themselves to become tools to technology. As devices become more advanced their capacity to store data and 'knowledge' can be staggering; perhaps even daunting. But change is coming and will keep coming whether or not society is ready for it. The key to ensuring advancements in mHealth are how well it is used. It must be embraced as an integrated part of healthcare. It is not a stand-alone solution.

But Mobile healthcare app options can be a mire to explore. Unless they are developed by non-profit making organisations such as the NHS, the developers or advertisers will charge for their use; where they do so, they are unlikely to be impartial for they must generate a profit margin.

Looking more specifically at mental health, there are several concrete ways in which mHealth could improve lives of services users.

The smartphone platform can provide an efficient method for accessing databases or other clinical information. Carers and patients could access a depth of knowledge at the touch of a button. Ascertaining that the app, and therefore the information, comes from a reliable source is also crucial. As smart phone develop, many now have the capacity to connect to biofeedback sensors and other external hardware devices to monitor for physiological signs (Luxton et al 2011). This can be very helpful in managing stress or even adverse effects of some medications.

MHealth has the potential to change the way some services are run. By its nature, it is portable and easily accessible. In service, where attendance to appointments can be sporadic, a resource like an app that allows an individual to be more autonomous could be of large benefit. Substance misuse is an area which could profit from this new approach. Surveys have historically found that young adults are more likely to suffer from substance abuse problems (Health and Social Care Information Centre 2013). MHealth could be a new way to reach this patient group. Unfortunately, no NHS developed/vetted apps either directed at patient or staff could be found online or when searching app marketplaces. However, a great many can be purchased on mobile market places, some of which have doubtful ethical benefits. Several apps exist that let you mimic snorting cocaine. White lines appear on your phone screen and when you run your nose across them they disappear. Many other apps are more responsible and promote harm reduction and self-awareness but these are not sanctioned by the NHS and their reliability can therefore be brought into question. Arguably, the time has come to invest in an app to provide more person-centred and empowering options for patients.

Mobile apps can also be developed for use by a carer. This is potentially a great boon for people supporting individuals coping with dementia. Ehealth has provided a number of facilitating devices to enable the sufferer and their carers, as well as the health care professional, to interact and promote independence and quality of life. People with dementia can wear a device on their wrist or in their pocket. If they leave a predetermined safe zone then this is picked up by global positioning satellite and a notification can be sent to a computer or mobile device (Thorne 2012). Ethical issues are clearly present in cases like these. A patient's right to autonomy has to be balanced out against risks posed to the individual if these methods are not used. A great number of apps exist targeted at the dementia sufferer themselves. Although at first new technology may seem an unlikely match , the tactile, versatile and easy to use nature of touch screen technology make it truly accessible (Alzheimer's Society 2014). It can be argued that mHealth for dementia is

not promoted enough and again more government support would be of long term benefit.

Depression is another potentially crippling condition that could benefit from mHealth. Current SIGN (2010) guidelines advise Cognitive Behaviour Therapy (CBT) as a preferred treatment option; unfortunately many waiting lists for psychological therapies exceed the 18 week period as laid out by commitment 13 of the Mental Health Strategy (Scottish Government 2012). CBT apps exist that are specifically targeted at depression but again none have been produced or reviewed by the NHS. For example, an NHS CBT app if used appropriately, could allow patients to claim more responsibility over their own recovery, reduce the need for drug therapies and, theoretically, reduce admissions to overloaded psychiatric hospitals.

In future we may see a GP prescribe an app for anxiety, depression or any number of mental health issues instead of traditional treatment options. Crucial links to rural service could be provided through mHealth that would not exist otherwise.

There is already much debate about the future of mHealth. The yearly eHealth Scotland (2014) conference sees mHealth as changing the way we work. MHealth can connect professionals away from the office leading to less time at a desk, flexible working patterns, better rural access and low network maintenance costs. EHealth solutions that are upcoming and integrate mHealth include online appointment booking, ALISS (Access to Local Information to Support Self-Management) as well as increased use of social media by the NHS. As we conduct more of our personal, and now professional, lives through the proxy of a screen, the risk of depersonalisation should not be ignored.

This is a very contemporary issue; professionals, patients and carers must voice their opinions as the healthcare landscape is changing rapidly. Mental Health professionals must remain engaged in the debate or risk being left behind. In a recent interview in the Telegraph (2013), the Royal College of Psychiatrists said that mental health must be given the same priority as physical health. This does not appear to be the case when it comes to mHealth. The nature of mental health illness means that generic apps simply will not suffice. The importance of confidentiality and reliability are of crucial importance. Simply because mood disorders and other mental health conditions are not straightforward to diagnose or treat does not mean that mHealth solutions are not viable. This is the time for initiative. In Leeds, the mHealth habitat project (2014) has recently been started. This collaborative group aims to create a thriving environment for the development of digital tools which will improve outcomes. Their focus is particularly on mental health and receives funding from two NHS trusts as well as a local commissioning board.

It is an exciting time; new ideas and projects can happen quickly with the right people and support available. NHS Scotland (2012) developed its eHealth Strategy to allow people, through the use of technology, to become more active participants in the care and services they receive.

However this appears incongruent to the present reality of mobile applications and their use in public healthcare. If mHealth is to truly reach its potential then issues such as ethics, policy, governance and funding must be honestly addressed. The current lack of regulation is leading to apps which have questionable confidentiality guarantees. Even more concerning are the reliability issues that could prove disastrous to the unaware user.

The risk is that technological advances are outpacing policies about the delivery of eHealth and mHealth. If we are to meet the Government's Vision for 2020, some key issues still need to be addressed. For better or worse, technology will play an ever increasing role in the delivery of mental health care needs. Changes are coming. Advances will not stop. The future is now.

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