MY SMARTWATCH SAYS…

Who is taking advantage of wearable health technology?

Welcome to the WiseGP newsletter, highlighting how research can help Wise General Practices address the top challenges facing primary care…

Ever feel like technology is taking over our lives?

An image has stuck in my mind from a recent trip into the Peak District when I passed a row of 5 walkers sat on a wall, all engrossed in their phones and seemingly uninterested in their beautiful green backdrop.

I must admit I hadn't realised how reliant I was on my phone until I forgot to take it to work recently and had to draw a map of my route to a home visit and struggle without access to all my apps and useful phone numbers!

It certainly feels like the COVID-19 pandemic has accelerated the growth of healthcare technologies for us all…

Patients have been eager to engage with monitoring their own health, including using wearable health technology. Electronic devices such as smartwatches are designed to give the user real time data on their personal health and exercise. These devices can send health information directly to a clinician, posing potential opportunities and challenges we need to consider. **Almost a quarter of the US population use wearable devices and their global popularity is predicted to climb[1], hence we need to consider how we will respond to this influx of data.**

Not owning a smartwatch, I have been surprised by some of the advanced technology now contained in these products. I frequently consult patients who present information from their watch about their heart rate or overnight pulse oximetry.

WiseGPs need to understand the technology available at people's fingertips, so they can explore and explain the information provided and take advantage of the opportunities offered.

Dr Annabelle Machin, WiseGP Fellow

Lets review what data can wearable health technology provide, then consider how a WiseGP can use it…

Pulse Rate

• Smartwatches can be programmed to notify a user if their heart rate is particularly low or high at rest [2].

• Accuracy can be reduced by movement, tattoos, if the watch doesn't fit well or if skin perfusion is poor due to the cold [2].

• A study assessing the accuracy of an Apple smartwatch in people with cardiovascular disease found that the watch measured pulse rate with reasonable accuracy, but over-estimated energy expenditure [3].

Pulse oximetry

- Newer smartwatches measure SpO_2 levels [2]. The accuracy of data provided has been found to be similar to a standard pulse oximeter. A study assessing the accuracy of measurements found a strong positive correlation between an Apple smartwatch and a standard pulse oximeter when measuring SpO_2 ($r = 0.89$, $p < 0.0001$) and pulse rate ($r = 0.98$, $p < 0.0001$) [4].

Blood Pressure

- Blood pressure monitors in the form of smartwatches are particularly useful at identifying BP variability and masked hypertension [5].

Pulse rhythm

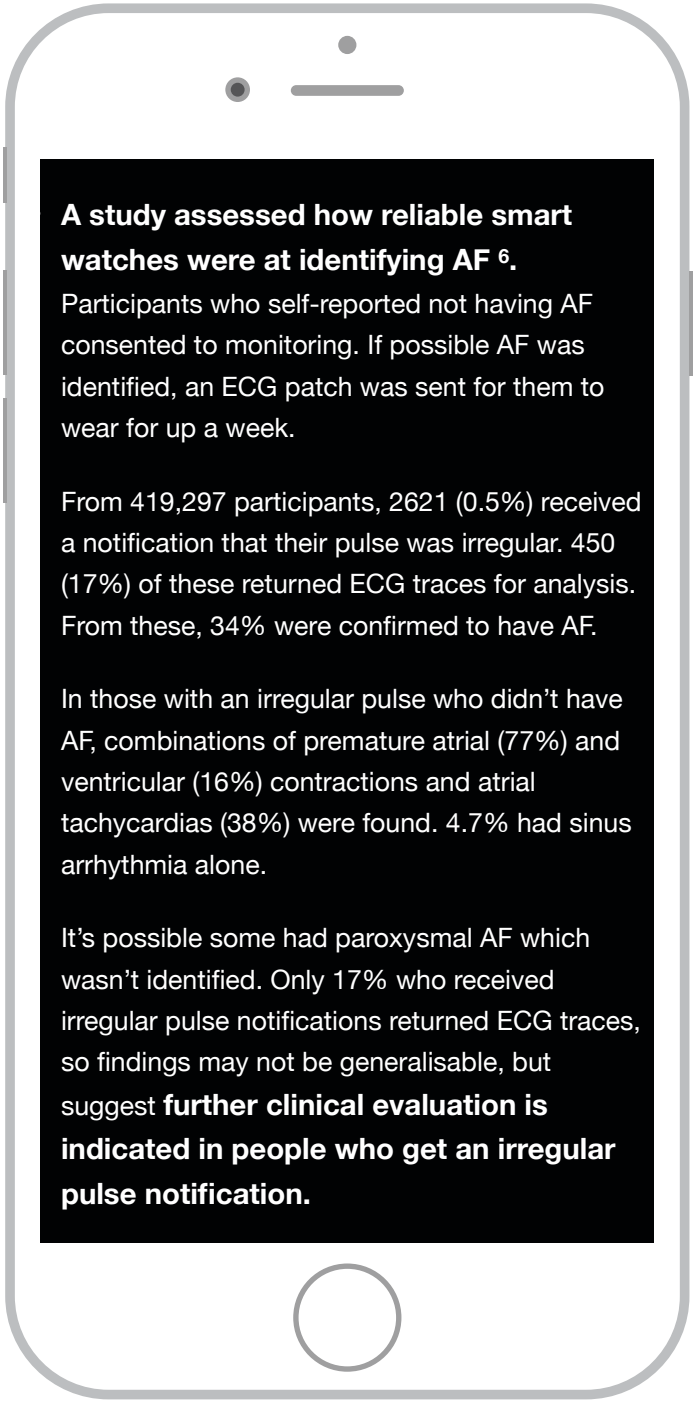
- Optical sensors on wearable devices can detect irregular pulses. If an Apple smartwatch repeatedly detects an irregular rhythm suggestive of atrial fibrillation (AF), the patient is notified and data recorded in their Health app [2].

ECG recordings

- A single lead ECG (Lead I), can be recorded on some types of smartwatch [2].
- The ability of an apple smartwatch to recognise AF from a single-lead ECG has been compared to the classification made by a cardiologist reviewing a 12-lead ECG. The smartwatch app demonstrated 99.3% specificity in classifying sinus rhythm and 98.5% sensitivity in identifying AF [7].

Falls Detection

- Apple smartwatches can detect falls [2]. An alert appears on a person's watch following a fall, which allows them to call the emergency services. If they are unresponsive, after a set time interval an emergency call is placed and a message sent to their emergency contact.



A study assessed how reliable smart watches were at identifying AF [6].
Participants who self-reported not having AF consented to monitoring. If possible AF was identified, an ECG patch was sent for them to wear for up a week.

From 419,297 participants, 2621 (0.5%) received a notification that their pulse was irregular. 450 (17%) of these returned ECG traces for analysis. From these, 34% were confirmed to have AF.

In those with an irregular pulse who didn't have AF, combinations of premature atrial (77%) and ventricular (16%) contractions and atrial tachycardias (38%) were found. 4.7% had sinus arrhythmia alone.

It's possible some had paroxysmal AF which wasn't identified. Only 17% who received irregular pulse notifications returned ECG traces, so findings may not be generalisable, but suggest **further clinical evaluation is indicated in people who get an irregular pulse notification.**

Biosensors

- Biosensors are a new and radically different type of wearable medical device [8]. These self-adhesive patches allow patients to move around whilst they collect data on their activity levels and vital signs. They can also be used to monitor blood glucose levels in diabetics.

There is even more technology on the horizon, including a wrist thermometer to help fertility planning in the next iteration of the Apple smartwatch and improved sleep tracking with an ability to detect signs of sleep apnoea [9].

What's your opinion of wearable health tech?

WiseGP Approach

Considering the potential benefits and harms of health technology…

So we've seen the range of data that health technology can already provide to patients and clinicians. However, data is only one part of the story. We- both the patient and clinician- need to interpret that data and consider what it means in the context of an individual patient. This is the knowledge work of an expert generalist. We explore the data, try to explain what it means and consider the potential for inaccuracies, agree a plan as an outcome of our consultation and then evaluate this over time.

Wearable health technology presents many opportunities for supporting diagnosis and monitoring of health conditions and also for generating whole person explanations and plans for care. With so many people having wearable devices, we have the chance to give more responsibility back to patients to monitor their long-term conditions. However, there remains a risk of inaccurate readings, the potential for people to get a false sense of security from their devices and the possibility of a misdiagnosis[10].

Studies suggest that continuous glucose monitors for people with diabetes mellitus can significantly improve glycemic control [11], though some patients can find monitoring intrusive and it can be associated with symptoms of depression[12].

There are many vulnerable groups to consider, particularly those with anxiety, obsessive compulsive disorders and anorexia nervosa. A recent study found evidence that people who track their activity or food intake using fitness trackers or apps had higher levels of disordered eating, including calorie counting and strict dieting, in addition to excessive exercise, compared to those who used no devices[13]. A longitudinal study would be required to infer cause and effect, as it could just be that people with disordered eating or exercise were more likely use trackers or apps. However, devices could potentially exacerbate or maintain disordered behaviour.

The interaction between a wearable device and a patient is likely to be complex, but it's conceivable that some people may benefit, whilst others may be harmed by using a fitbit.

Using your observational skills, do you ever take note of whether your patient is wearing a smartwatch or fitbit?

Do you ever enquire about use of these devices in people with health anxiety or other conditions (eg. eating disorders)?

We may not have all the evidence to inform us of the potential harms of these technologies, but perhaps we should be actively enquiring about the use of smart devices for health monitoring in potentially vulnerable groups and ensuring they are not contributing to harm.

Wise General Practice Approach

Learning for the wider general practice team…

Within each newsletter we will consider the approach of a WiseGP and the wider general practice team.

We will share case studies to show how key learning points could apply to wider team members in general practice. Visit the WiseGP website to review our case study titled "Using health tech" and get inspiration for how members of a Wise General Practice team might use wearable health technology to improve patient care.

Our next newsletter is called "Against the Clock" and is focussed on our lack of time and ways we can combat this…

HIGHLIGHTS FROM WISEGP

The Tailor medication synthesis was funded by NIHR to understand what is known about deprescribing to help clinicians make decisions in everyday practice. The report found that deprescribing when performed using a systematic approach is a safe, effective and acceptable intervention for clinicians. It also found it is safe and appropriate to personalise our approach to deprescribing based on individual patient need. This may need us to make changes to the systems we work in.

Have a look at this free e-learning program that explores the findings further and discusses ways to use them in practice to improve patient care. To access this you will need to register for a free NIHR learn account using either an nhs.net or ac.uk email address.

https://learn.nihr.ac.uk/course/view.php?id=1069

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