Use of smartphone apps by paediatric trainees

Over 70% of the population owns a smartphone and there are now millions of apps available. This study looks at smartphone and app use among paediatric trainees, in particular whether they are accessing medical apps to help with clinical practice.

Background

Over 35 million people in the UK have a smartphone. This is 70% of the population, rising to over 80% for the 18–24-year age group and falling to 55% for those over 55 years of age (Deloitte, 2014). Around one in six adults look at their mobile phones more than 50 times per day and a third who own a phone do so within 5 minutes of waking. Simply 'The smartphone has become the device that many of us cannot live without' (Deloitte, 2014).

In the past, phones were mainly used for calling and sending texts. With the progress in technology, including 4G connectivity, smartphones have more advanced computing, capability and connectivity than basic feature phones. Most smartphones now have a touchscreen interface, web browsing, PDA (personal digital assistant), media player, a digital camera, GPS (global positioning system) navigation unit, motion sensor, the facility to make mobile payments and an operating system capable of downloading applications. The launch of the iPhone by Apple in 2007 is widely considered to be the birth of smartphones.

A major attraction of smartphones was the introduction of applications (apps), software which is designed to run on smartphones, tablet computers and other mobile devices. It is difficult to get accurate information on the number of apps in the world but the current number of Android apps available on Google Play is over 1.5 million (AppBrain Stats, 2015) and those available on the Apple store rose from 500 apps in 2008 to 1.3 million in September 2014 (The Statistics Portal, 2015).

A systematic review of health-care applications for smartphones (Mosa et al, 2012) found 83 applications for health-care professionals including 57 focusing on disease diagnosis, six on drug reference and eight medical calculators. A study of Irish interns (first year doctors) found that most used a smartphone on a daily basis (O'Connor et al, 2014). There are a number of specialty-specific apps including ones for oncology physicians (Rozati et al, 2014), paediatric anaesthetists (Bhansali and Armstrong, 2012) and vascular surgeons (Carter et al, 2013) and more general ones for areas such as prescribing (Haffey et al, 2014). Some paediatric-specific apps focus on practical skills such as neonatal intubation (Hawkes et al, 2013) and measurement of heart rate (Ho et al, 2014), while another focused on educational health-care information for patients and parents (Sargant and Milsom, 2012). However, there is a lack of studies looking at the extent of app use among trainee paediatricians of all grades. The authors undertook a questionnaire study to investigate how many paediatric trainees owned a smartphone, their use of apps and which specific medical apps they used.

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Methods

A questionnaire was developed and sent to all paediatric trainees in the West Midlands Deanery in specialty training years 1 to 8 (ST1–8) using a recognized survey website (www.surveymonkey.com). The questionnaire was modified from a previously published study with the authors' permission (Payne et al, 2012) and piloted before distribution in spring 2014. A reminder email was sent to all trainees after 3 weeks.

The questionnaire collected data on the following areas: demographics including age, gender and level of training, ownership and use of a smartphone, number and type of medical apps, frequency of use and time spent on medical apps. A free text box encouraged trainees to add comments about use of smartphone medical apps.

Results

Response rate to the questionnaire was 33% (100/300); 68% of respondents were female and 32% were male, in keeping with the demographics of the paediatric workforce. *Figure 1* shows the grade of trainees responding to this questionnaire. Three respondents did not answer this question. The majority (63%) of respondents were 25–34 years old, with 36% aged 35–44 years and just 1% over 45 years of age.

Smartphone ownership

A total of 94% of respondents owned a smartphone, with the majority (72%) using an Apple iPhone, 22% using Samsung, 2% owning a HTC and 2% having other models. *Table 1* shows the number of medical apps on smartphones. Free text comments from trainees are shown in *Figure 2*.

Ownership of medically-related apps

A total of 81% (76/94) of people with a smartphone owned medically-related apps. Those used the most were apps such as email, calendar and password apps, which were used by 55 (59%), 66 (70%) and 43 (46%) people respectively, said to be 'constantly used' by 28, 36 and 21 people respectively. The most commonly used medical apps were medical formula or drug reference ones (56 (60%) people). Commonly used medical apps were a medical calculator, resuscitation protocols, diagnosis or management apps such as National Institute for Health and Care Excellence and medical journals (used by 52, 48, 47 and 46 people respectively). Less commonly used were patient education apps (18/74).

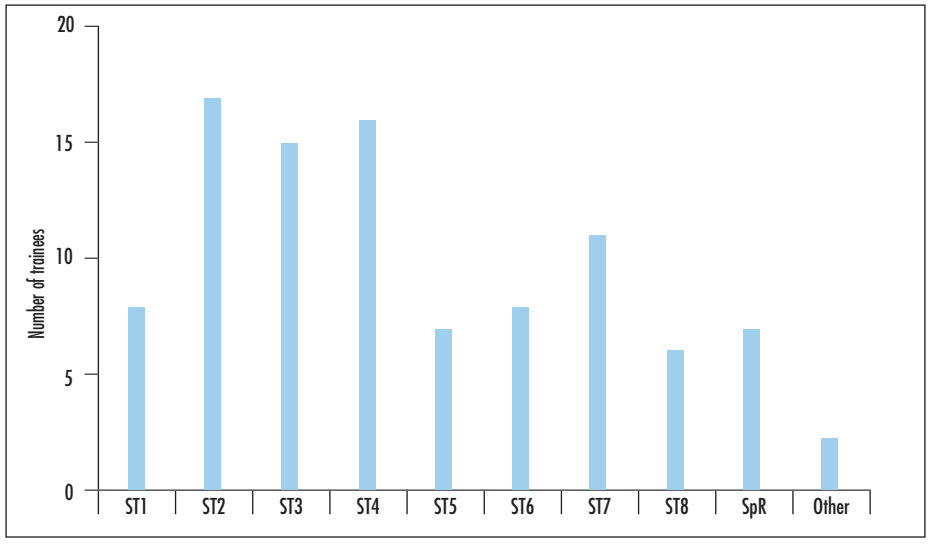

Figure 1. Respondents and their level of training in paediatrics. SpR = specialist registrar; ST = specialty trainee.

Frequency of use of apps

The majority of people (65/75, 86%) used their medical apps at least once per week, with 23% of responders using their apps several times a day, 25% 1–2 times per day and 25% 2–3 times per week. Of people who responded to this question 11% said they rarely used their apps and only 2% said they never used their apps.

Of the 75 people who responded to this question 50% (38) stated that they spent up to 10 minutes every day using smartphone applications related to clinical activities, 26% spent 11–20 minutes daily, 12% spent 21–30 minutes daily and only 3% spent more than 30 minutes every day.

Recommended apps

This questionnaire asked which smartphone apps people would recommend. The British National Formulary for Children app was the most mentioned, with 26/53 recommending it. Other apps recommended by a number of respondents include Paeds ED, Paediatric Emergencies, MedCalc (Professional Medical Calculator), National Institute for Health and Care Excellence guidance and Neonatal Intensive Care.

Table 1. Number of smartphone apps respondents reported using

No of apps	Respondents
1–4	58%
5–9	26%
10–14	9%
15–19	5%

Difficulties in app usage

The final question asked people what their thoughts were on the use of medically-related applications in a clinical environment. A consensus opinion was that using your phone in a clinical area can appear unprofessional as patients, parents and colleagues may assume the phone is being used for personal reasons. Other issues highlighted were that in hospitals there is often little or no mobile signal and so using internet-based apps is difficult. Also in some trusts, phones are banned for reasons of patient confidentiality or infection control.

Recommendations for future use of apps

Many people expressed a view that medical applications are a valuable resource which are likely to be used more and more often in the future, and that with WiFi signal, they could indeed be an indispensable clinical tool. Several highlighted that it would be safer for apps to be approved by a central body (e.g. Royal College of Paediatrics and Child Health) to ensure that they contained up to date, evidence-based information when relying on them in clinical practice. A number of trainees said that an app would be very useful to be able to send workplace-based assessments (e.g. mini clinical evaluation exercise, direct observation of procedural skills, Royal College of Paediatrics and Child Health multisource feedback) as well as updating the ePortfolio.

Discussion

An overwhelming majority of paediatric junior doctors (94%) owned a smartphone, with 81% having medically-related apps on their smartphone. This figure is higher than the population in general, with 85% of 25–34-year olds owing a smartphone in May 2014 (Deloitte, 2014), and it is almost identical to the percentage owning a smartphone in a study of Irish interns (O'Connor et al, 2014). Interestingly only 75% of East Midlands foundation trainees owned a smartphone in 2012 (Payne et al, 2012). Although smartphone usage increased by 10% in those over 55 years between 2013 and 2014 there was no difference in numbers owning a smartphone in the 24–34-year age group in this period (Deloitte, 2014). An American study of trainees (residents and fellows) in 2012 found 85% used smartphones with variability by specialty. Paediatric trainees had nearly the lowest usage at 78% with a range in usage from 92% in emergency medicine to 77% in radiology (Franko and Tirell, 2012). Despite variations in number of trainees owning a smartphone all studies found that a high proportion of trainees use smartphones.

A majority (81%) of respondents to this questionnaire had medical apps on their smartphone. This is significantly higher

Figure 2. Examples of verbatim comments from trainees.

'An excellent but under [used] resource though I would worry about some apps containing incorrect/outdated information. So a list of apps approved by the RCPCH [Royal College of Paediatrics and Child Health] would help.'

'Great time saver. Do not need to look for BNF [British National Formulary].'

'Apps give quick answers when needed. Reassurance as guides are at hand.'

'Would be great to have paediatrics and neonatal network guidelines as an app, with easy search facilities for guidelines. Also if we had apps to send for DOPS [direct observation of procedural skills], miniCEX [mini clinical evaluation exercise] etc.'

'I have found using a smartphone helpful in my personal development, e.g. making note of an interesting case to come back and read, reading lists, reminder emails to myself.'

than the study of American trainees in which 49% of paediatric trainees were using apps in their medical practice, although this percentage is likely to have increased since the completion of the study (Franko and Tirrell, 2012). The number of paediatric trainees using apps is higher than Irish interns, with O'Connor et al (2014) finding 72% used an app once a month or more. In contrast only 11% of respondents in the current study rarely used apps and 2% never used them.

The British National Formulary being one of the most popular apps fits with American trainees' app use, showing 79% used drug guides (Franko and Tirrell, 2012) and 30% of Irish interns used the British National Formulary (O'Connor et al, 2014). Drug dosage calculators were commonly used in these studies as well as by a number of trainees in the current study. Drug guides and calculators were two of seven categories of medical apps mentioned in a systematic review of the literature by Mosa et al (2012). As Benavides et al (2011) stated in their systematic evaluation of paediatric medicines information in support tools on smartphones, many medications in paediatrics are used off label and are non-licensed so these apps are needed. Haffey et al (2014) identified 306 apps to aid prescribing. A third category in common with the Mosa et al (2012) review was literature search, including trainees using their apps to access National Institute for Health and Care Excellence guidelines.

It is interesting to note that some respondents felt that using a smartphone in a clinical area can appear unprofessional as it may be used for personal reasons. Wifi coverage in hospitals is also variable making usage at times difficult. These are key considerations for app use and any future professional guidelines which are issued.

Trainees who responded to this study wanted apps to be approved by a central body such as the Royal College of Paediatrics and Child Health. This is a key theme in the literature where the safety of using unregulated apps is called into question. Buijink et al (2013) point out that little is known about the potential dangers associated with app use and Ozdalga et al (2012) highlighted lack of evidence. Attention is drawn to the lack of information on medical expertise of app developers (Haffey et al, 2014) and inadequate input from doctors into app development (Edlin and Deshpande, 2013). Carter et al (2013) found only 13 apps (27%) had documented medical professional involvement in their design or content. Quality and reliability of apps will only improve with robust regulation (Carter et al, 2013).

Limitations of this study

This study was undertaken in one deanery and only looked at paediatric trainees. Only a third of trainees completed the questionnaire and it is possible that those who replied were those most in tune with technology.

Conclusions

An overwhelming majority of trainee paediatricians currently own smartphones. It is highly likely that these will be increasingly used in future, especially as Wifi coverage improves. The majority of those who own a smartphone have and use medically-related apps. Access to prescribing information, medical calculators and literature searches are key apps in agreement with the literature. Guidelines are needed for smartphone use in clinical areas and during working hours where professionalism could be called into question. Paediatric trainees wanted regulation of apps, in agreement with reports from other specialties. This quality assurance will be essential to providing safe patient care. **BJHM**

Conflict of interest: none.

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KEY POINTS

- An overwhelming majority (94%) of paediatric junior doctors own a smartphone.
- Medically-related apps are used by 81% of paediatric trainees, of which the most popular related to drug prescribing, calculations and guidelines.
- Guidelines are needed about use of smartphones in clinical areas and what is considered professional behaviour.
- Improved Wifi connectivity is needed in hospitals to use apps to their full potential.
- Quality assurance of apps by regulatory bodies is urgently needed to ensure safe patient care is delivered following use of an app.