Pilot Study of iPad Incorporation Into Graduate Medical Education

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Abstract

Background Increased documentation and charting requirements are challenging for residents, given duty hour limits. Use of mobile electronic devices may help residents complete these tasks efficiently.

Objective To collect initial data on usage rates, information technology (IT) support requirements, and resident use of iPads during training.

Methods In this pilot study, we provided 12 residents/fellows from various specialties at the University of Virginia with an iPad with IT support. The system used a virtual private network with access to the institution's electronic health record. Participants were allowed to develop their own methods and systems for personalized iPad use, and after 9 months they provided data on the utility of the iPad. Feedback from the IT team also was obtained.

Results Average iPad use was 2.1 h/d (range, 0.5–6 h/d). The average self-reported reduction in administrative work due to the iPad was 2.7 h/wk (range, 0–9 h/wk). A total of 75% (9 of 12) of the users would recommend universal adoption among residents and fellows. More than 90% (11 of 12) of users reported the iPad would improve communication for coordination of care. A total of 68% (8 of 12) of users reported that an iPad facilitated their activities as educators of medical students and junior residents. Residents cited slow data entry into the electronic health record and hospital areas lacking Wi-Fi connectivity as potential drawbacks to iPad use. The IT team reported minimal support time for device setup, maintenance, and upgrades, and limited security risks.

Conclusions The iPad may contribute to increased clinical efficiency, reduced hours spent on administrative tasks, and enhanced educational opportunities for residents, with minimal IT support.

Introduction

Compliance with documentation and charting requirements has been increasingly difficult to fit into resident physicians' work hours.[1] A recent study raised concerns that residents appear to be spending more time on documentation than they do with patients.[2]

Few studies have assessed whether the iPad might improve resident training. Although one such study was limited to internal medicine residents,[3] the iPad seems tailored to broader use, allowing access to the electronic health record (EHR), hospital imaging software, and Internet-based literature searches while in conferences or on rounds; storage of electronic copies of manuscripts and textbooks; and videoconferencing.

After the University of Virginia implemented a comprehensive EHR system, residents noted decreased work efficiency. A pilot study was initiated to examine the acceptability and feasibility of iPad use by residents to help improve work efficiency.[4]

Methods

The study was initiated to explore the incorporation of the iPad into the resident workflow and educational process, as well as to determine the information technology (IT) support

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requirements for implementing an iPad program in an academic medicine setting. Twelve residents (6 radiation oncology, 1 hematology/oncology, 1 neurological surgery, 1 general surgery, 1 otolaryngology, 1 internal medicine, and 1 family practice) were provided with iPads (versions 1 and 2; Apple Inc, Cupertino, CA) and technical support that allowed access to the Internet, and virtual private network (VPN)/Citrix-based access to the EHR provided by Epic Care (Epic Inc., Verona, WI). The iPad was used to access the EHR in both inpatient and outpatient settings. Residents were selected primarily from radiation oncology because the study was funded by an educational grant awarded to a member of that department. Participants were given basic training on the iPad and EHR access. Rather than following a protocol for use of the iPad, participants were free to explore their own uses of the device, as well as ways to increase clinical efficiency and their educational experience.

About 9 months after receiving an iPad, each participant completed a survey to evaluate device use and participant satisfaction. The survey was developed by the authors and was not pilot tested. In addition, IT personnel working with the pilot participants summarized their experience with iPad implementation in the clinical setting. Simple descriptive statistics were used to report the findings of the survey.

This study was deemed exempt from Institutional Review Board review.

Results

The TABLE summarizes survey questions and responses. The average amount of iPad use was 2.1 h/d (range, 0.5–6 h/d). A total of 31% (range, 0%–60%) was dedicated to clinical care, 45% (range, 20%–70%) to education, and 24% (range 5%–60%) to personal use. The average reduction in administrative work per week was 2.7 h (range, 0–8 h).

A total of 9 of the 12 residents (75%) recommended iPad distribution to all residents and fellows. A total of 58% (7 of 12) cited ease of access to institutional and national care guidelines as a major clinical advantage. A total of 91% (11 of 12) stated that the iPad could improve communication for coordination of care. Specific reasons cited were improved real-time multidisciplinary reports (such as tumor board recommendations), immediate access to EHR team orders, and ease of sharing updated patient care management signout sheets. A total of 70% (10 of 12) reported that the iPad significantly improved patient care when taking call from home because of the EHR access to review patient medical records during patient calls and the ability to authorize electronic prescriptions.

All participants stated that iPad use would be a symbol of a supportive and technologically advanced graduate medical education program willing to invest in resident education, and that this would attract the best candidates. Residents reported that iPad use would demonstrate to the general public that the medical center was technologically advanced. Two-thirds (8 of 12) of residents noted that the iPad improved the teaching of junior residents and medical students. A total of 83% (10 of 12) stated that if the institution paid for 50% of the cost, they (the student in question) would pay the remainder to keep the iPad.

The iPad was reported to be highly portable and safe to store. The chief criticism reported was that that typing longer notes (ie, complex EHR data entry) could be tedious.

The IT team summary found the basic iPad configuration to be relatively simple compared with that of a desktop computer. Outside of basic configuration or occasional reconfiguration, the IT team spent less than 1 hour per month supporting these devices.

Discussion

The iPad increased access to the EHR and to evidence-based medicine guidelines. These benefits need to be weighed against infrastructure costs, patient information security issues, and infection control concerns.

Our pilot study, albeit small, involved residents from different disciplines. There was no single reason why adoption was not recommended among all residents and fellows, although some residents may have found it difficult to incorporate the iPad into their training.

The iPad was used slightly more for education than for clinical use, based on percent of time usage. This is likely because of its major limitation—complex data entry—for which the keyboard appears to be inadequate when longer text entries are required for documentation. The reduction in duty hours reported by residents using the iPad corroborates previously reported findings that 78% of residents felt that it made them more efficient.[3]

Although we did not perform a cost analysis to compare the iPad to other systems designed for mobile hospital computing, the iPad is relatively inexpensive compared with existing portable computing solutions, such as desktop computers or workstations on wheels. Although iPads require minimal maintenance costs because of the stability of iPhone operating system and software architecture, iPad use on a larger scale—for example, by hundreds of residents—might present a challenge to hospital IT staff to ensure adequate wireless infrastructure and compliance with Health Insurance Portability and Accountability Act standards.

Although one responder noted that the iPad has made it possible to execute multiple tasks from a single device, the desktop workstation will remain the portal to the EHR until faster complex data entry on the iPad can be achieved.

TABLE **iPad Use Questionnaire and Results**

Question	Response		
How many total hours do you use your iPad during duty hours in a typical day?	2.1 h/d (range, 0.5–6 h/d)		
What percent of time do you use the iPad for the following purposes in a typical day?			
Clinical Care	31% (range, 0%–60%); average 37 min/d		
Education	45% (range, 20%–70%); average 54 min/d		
Personal Use	24% (range, 5%–60%); average 29 min/d		
How much has use of the iPad decreased your total weekly duty hours[a]?	2.7 h/wk (range, 0–9 h/wk)		
	Yes (%)	**No (%)**	**Respondents**
Would you recommend iPad distribution for all residents and fellows at University of Virginia?	75	25	12
If all residents and fellow had an iPad with continuous connectivity, would this improve communication for coordination of care or facilitate patient care transfer?	91	9	11
Do you think that widespread iPad use by residents/fellows would be considered by residents and fellows in the Match as a symbol of a supportive and technologically advanced GME program that would attract the best candidates?	100	0	12
If the institution paid for 50% of the iPad would you be willing to pay for the additional 50% if you would keep the iPad at the end of your training?	83	17	12
Does having an iPad help you teach junior residents or medical students, ie, make you a better educator?	67	33	12
Has having an iPad reduced your duty hours by either making you more efficient at work or by allowing you to take care of issues during call from home without having to come to the hospital?	75	25	12
Has having an iPad improved your ability to care for patients when taking call from home?	70	30	10

Abbreviation: GME, graduate medical education.

[a] In this context, "duty hours" refers to time spent on administrative work.

Voice recognition software from Dragon (Nuance Networks, Burlington, MA) or Siri (Apple) may offer solutions. We will examine voice recognition in the next phase of this pilot study. We will also evaluate whether the Epic Care iPad app Canto, which does not require a virtual private network, can enhance clinical efficiency.

Limitations of our study include the fact that it was conducted at a single institution, the small sample size, and the use of self-reported data to assess time savings and increased efficiency.

Conclusion

Our pilot data suggest that iPads may improve resident efficiency and reduce time spent on administrative work. Further research is needed to assess whether the iPad should be integrated into graduate medical education programs. The device overall required minimal information technology support. Use of the iPad was recommended by most residents in this study.

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