The Application of Cell Phones in Medical Information

Seddighe Mohammad Esmaeili[1]
Assistant Professor of Library & Information Sciences, Islamic Azad University. Science & Research Branch Tehran. Iran
Laleh Joulahi Saravi[2]
Ph.D. Student of Knowledge & Information Science, Shahid Beheshti University of Medical Sciences, Rehabilitation Faculty, Tehran, Iran

Abstract: Cell phone technology is being increasingly used by clinicians to access up-to-date information during patient care. Medical students, residents, and faculty members of medical faculties or hospitals use mobile devices, such as smartphones (e.g., iPhone, Android, Blackberry) and tablet computers (e.g., iPad), to answer clinical questions and find medical information. This article investigates the previous studies on the Benefits and Applications of Cell phone in medical sphere.

Keywords: Information, cell phone technology, medical information, medical sphere.

Introduction

Today, ICT is extensively used by physicians in Medical sphere and related sciences.(Behbahani 2010). For example, clinicians who consult with each other about their patients through landline or cell phone every day. Doctors, nurses and medical groups of students treat and cure their patients' using specialized information resources. To enter the age of knowledge and information explosion, we should be equipped with so as to enable ourselves to cope with technological progress; equipment such as computers, Internet, advanced software and the cell phone too(Hajiha 2009). The development of new information technology improves public access to information on all aspects. With the advent of mobile phones, and particularly smart phones, the concept of mobile phone as only a means of communication and sending text messages has changed. Also, with the arrival of mobile phones, many libraries offer services through a small screen.(Krishnan 2010). The study, which was conducted by researchers, proved that Researcher stand to surf the web via their mobile phone, compared to their computers. Because Mobile phones always on and you can quickly receive the information.(Abagheri2010). Their search showed that53% of girls' and39% of boys bought Mobile phone after entering university and there is no Difference between sex and the use of mobile phones. Students maintained the priority of Using Call and SMS services, mobile phone applications and its ancillary facilities.(Behbahani 2010)

Therefore, mobile devices and the associated applications have become an indispensable part of people's daily lives. There are more than twenty functions of mobile Web which users currently take advantage of and can be divided into three categories, communication, information and resources download and/or play, and information search. (Wang, Ke et al. 2012). Factors which facilitated the increased use of medical apps include convenience, cost, ease of use, comprehensive coverage, variety and utility.(Kwee Choy Koh, Wan et al. 2014). This article would help us understand how to maximize the effectiveness of mobile learning and learn to use it effectively in the realm of searching and restoring medical information.(Davies, Rafique et al. 2012)

Cell Phone and Providing the Patient with Information

A previous research focused on the effect of increased attendance at clinics and health services by SMS. They applied Mobile phones and short message services at clinics to enhance the quality of message recalling which is a simple and efficient method of providing health care services and leads to better results for reminding patients of the treatment.(Guy, Hocking et al. 2012). Health information technology (HIT) is a promising tool to offset challenges physicians face in delivering self-management .Through HIT, including patient portals, mobile applications, and automated phone technologies, providers and patients can communicate beyond the 15-minute office visit.

---

[1] Email: m.esmaeili2@gmail.com
[2] Email: joulahi@gmail.com (Corresponding Author)

Health care providers, through automated technology, can remind and educate patients to take care of themselves and can also collect information from patients on self-care activities as well as self-assessments. At the University of Chicago Medicine (UCM), a mobile phone-based diabetes self-management program was implemented in which patients receive tailored health information via text message and reply to questions about self-management. In addition, they created a summary report of the data to share with individual participants' physicians.(Nundy, Lu et al. 2014)

Mobile and Medical Students

Wireless technology is a way to provide new content and facilitate information access wherever a student is located. Mobile technology provides students with the permanent access in every place and time, through the use of smartphones and tablets possessing additional benefits including increased functionality, sophisticated graphics and a larger screen and hence, allowing students to engage with their learning materials in new and compelling ways.(West 2013)

Many medical schools and clinical training programs are encouraging the use of mobile devices for education as well as daily clinical activities. Emerging research has even suggested that the implementation of mobile devices and associated apps have led to increased productivity and access to clinical information at the point-of-care.(Aungst, Clauson et al. 2014)

It is now possible for Smartphones to provide immediate electronic access to medical texts without the need of the internet. Specific software can allow users to search quickly across a library of texts. Such technology offers point-of care, bedside or 'just-in-time' information to support learning and practice.(Hardyman, Bullock et al. 2013)

Medical librarians were among the first to widely recognize the potential impact of mobile technologies on librarianship as an example of the depth of mobile-device penetration into the medical field. In 2010 the Food and Drug Administration approved the marketing of the Airstrips suite of mobile-device applications. Locally, Utah State University students have adopted smart phones at the rate of 39.3 percent and other handheld Internet devices at the rate of 31.5 percent. These statistics indicate that skills of using smart phones are increasing and the technological landscape is changing quickly. USU students show interest in adopting new technology. While USU students are less likely to own mobile devices, 70.2 percent of respondents indicated that they would be likely or very likely to use library resources on smart phones if they owned capable devices and if the library provided easy access to materials.

In order to launch advanced interactive access to library resources, a programmer who is interested in developing mobile apps on a number of platforms is needed. Device-specific applications allow for the use of phone features such as GPS and orientation sensing via an accelerometer and provide the basis for augmented reality technologies.(Dresselhaus and Shrode 2012)

More than 40% of medical students showed they turn to smartphone medical apps as their first choice of reference.(Kwee Choy Koh, Wan et al. 2014)

Students 'attitude to using and deciding to use mobile is having positive effects on the acceptance and use of mobile phones among students. (Zamani, Babri et al. 2012). (Lubega, McCrindle et al. 2004)

Most services that MEDICAL STUDENT received through the use of wireless application included SMS, games, news and jokes. Renewing of library items, getting information from the library and checking records of borrowed books are among the highly demanded services. (Karim, Darus et al. 2006)

Mobile and Medical Diagnosis

Research has been done also, on the use of smart phones and Pocket Such as personal digital assistants by students and medical assistants. It was concluded the large volume of data that is daily produced, PDAs and smart phones are useful tools for physicians and medical students; they could, easily, have access to updated information while being at the patient's bed, by means of using this tool in an attempt to improve their medical knowledge.(Tahamtan 2011). (Sharif 2010). (Didegah 2009).

Many practitioners are gravitating to mobile devices as a tool to increase access to medical information and as an access point to the electronic health record (EHR).(Aungst, Clauson et al. 2014)

With the increasing new technologies, especially wireless technology, Patrons of libraries and information centers can from everywhere establish contact with the center and would benefit from services; In addition, it is stated that, in terms of libraries and information centers, the use of wireless technologies will lead to cost savings and effectiveness in the operation. When user stake advantage of their personal digital assistants, the Library will not be needed to provide necessary hardware such as computers in the library. (Sharif 2010).

Other uses of "personal digital assistants (PDA)" have been proposed to provide better services to the disable people at library. Handicapped people can carry it without needing a table or any other means and is preferable to laptop due to the ease of transport and easy access without requiring any workspace. Email reference services are provided in the form of abstract reference services in which the users send their questions to the library and librarians through email. This kind of service is of utmost importance at libraries whose potential customers are people with movement disabilities. They can meet their information needs through the network and internet. The service of sending messages is indeed useful for the handicapped, as they can pose short questions and be informed of the library's resources within working hours. The services available can be inquired through chatting, digital newspapers and books and Braille printer which can be applied by the disable people so as to get the latest information. (Didegah 2009)

Despite the existence of PDAs and the introduction of the iPhone, iPad, and other smartphones and tablets, there has been a change in the type of obtaining information, so much so that the information can be easily accessed on mobile devices.
These changes have participated both in the medical literature and the library literature by an increase in published researches on the use of mobile devices in medicine. A 2012 literature review inquired published research on ''innovative roles of the smartphone in the field of internal medicine…[including] patient care, medical reference, and continuing education…[and] uses of the smartphone in medical education, communication, and research''. The review found sixty research articles from 2007 to May 2012 that met the stated inclusion criteria. (Boruff and Storie 2014)

Cell phone and Distance Learning

Medical students need to assimilate considerable new information during their studies especially with the need For evidence based practice, and they must develop skills for lifelong learning, keeping their knowledge updated, as there have been rapid advances in the development of new teaching methods and learning resources, and a considerable enhancement in the availability of electronic and mobile sources. Recent news reports show an increasing use of mobile and smartphones by young age groups, thanks to the easy access to the internet and medical 'apps.(Davies, Rafique et al. 2012)

The most basic services which can be seen made in the form of information Delivery are examination results, admission status, course registrations, etc., from the institutions to their respective customers .The most common wireless phone application services that have been
Used in educational field are information queries and deliveries via SMS .The information that can be applied in a centralized SMS is, such as:

1- Reading lists – the list of the books, which are in the library;
2- Lectures, meeting schedule, exam dates;
3- Academic information about the students;
4- Crucial homework reminders;
5- Web link;
6- Urgent messaging;
7- Announcements – thought/facts of the week, information about new activities, Changes in schedules; and
8- Mobile author application: it will help lecturers/teachers/instructors/tutors to Create and author their computer-based courses. (Karim, Darus et al. 2006)

Reasons behind Avoiding Cell Phone

For the following reasons, the library does not use the mobile service. There are problems for the library in providing mobile phone library services, however. These include lack of telecommunication infrastructure in the library (17, 18.91 percent); high cost of telecommunication (5, 5.55 percent); high cost of calls (tariff) from the

operators (7, 7.78 percent); interconnectivity problems (6, 6.66 percent); network congestion/call failure (11, 12.22 percent); delay/undelivered text messages (7,7.77 percent); neglect on the part of library management (9, 10 percent); and abuse on the part of library users (1, 1.11 percent). While these are the views of staff, library users complained of other problems. These are switching off mobile phones in the library (57, 63.33 percent); high cost of calls (tariff) (18, 20 percent); network problems 13 (14.45 percent); and abuse 2 (2.22 percent) by users. (Iwhiwhu, Ruteyan et al. 2010)

Library Services based on Cell Phone

Services that Libraries can offer to their users via mobile Included:

- checking records of books borrowed;
- getting alerts on overdue books;
- getting alerts on outstanding fines;
- receiving reminders to return library items that will be due soon;
- renewing library items;
- reference enquiry services;
- receiving text alerts about the arrival of new resources on the library web site;
- getting alert on library event information;
- getting information from the library opac/database; and
- Contacting librarian for help. (Karim, Darus et al. 2006)

By supporting accurate prescribing and treatment planning, the electronic library contributed to enhanced patient care. (Hardyman, Bullock et al. 2013)

Mobile Services in Iran

Mobile services are performed in some of the libraries in Iran and some of Mobile Services are provided as well in the Libraries such as the National Library and Astan Ghods Razavi. The services are in keeping with mobile services while being in the form of searching the library indexes, message and Bluetooth services and they indicate the positive attitude of the library managers toward installing and using modern mobile services. An example of this is the National Library, which includes the installation of software on mobile Bibliography and obtaining a list of books for those interested in, as well as possible Sources of Information regarding the Parliament library, which are available on mobile phones of Android System. Library of Astan Quds Razavi deals Bluetooth and SMS services.(Alavifar 2013)

Mobile medical applications

Mobile applications, also known as 'apps', have seen rapid growth with the release of affordable smart devices. Major stakeholders in mobile apps include Apple, Google, Microsoft and Blackberry. Each company owns their own independent mobile app store for software on their operating system (OS). There are approximately 20,000 medical apps available for IOS compared with 9000 medical apps available for Android. (Aungst, Clauson et al. 2014) A mobile application is standalone software, installed on a smart device (e.g. smartphone, tablet computer). There are multiple potential benefits provided by mobile apps exclusively in the sphere of healthcare.

1. They are easy to use and accessible to clinicians and patients at the point-of-care.
2. Their ability to store at a locally and Access to the Internet, potential development and capabilities of mobile applications.
3. Development costs are relatively low and, allow for rapid development and implementation of programs as well as frequent updates.
4. Mobile applications are able to cooperate with many features of mobile devices, including Camera, accelerometer, microphone, speakers, and Near Field Communication.(Aungst, Clauson et al. 2014)

Conclusion

Mobile technologies are now such a part of the fabric of the hospital environment. Those hospital libraries must take this opportunity to continue to positively impact health outcomes by providing health professionals with valuable information and services via personal digital assistants (PDAs) and Smartphone. Hospital librarians,

regardless of staff and budget shortage, or lack of access to technology, can position the hospital library to connect health professionals to clinically relevant mobile resources and library services. (Klatt 2011) Using these Tools will improve Medical centers Efficiency and Quality of healthcare services if these tools are used in medical centers in Iran. As a result, there would be a reduction of medical errors in addition to a faster and more efficient treatment. Also, if these tools are employed in medical centers, many communication problems between staff and patient will be resolved.(Tahamtan 2011)

With respect to the spread of mobile's practical comprehensive tools Such as PDA and Smartphone, tablets and etc., in Medical centers like hospitals and clinics, it is clear that this technology should be applied to inform and educate medical students, faculty and staff. Also, they have been beneficial in the realm of self-care and medical information. In the field of medical librarians, mobile-based library provided the users with the latest clinical information and electronic medical resources easily and as soon as possible. Holding classes with the purpose of introducing mobile applications and training staff and students as to how to use them would double its benefits.

References

1. Abagheri, M. H., Y (2010). "Mobile library services based on the new age of information." LISNA.Librarian.
2. Alavifar, B. (2013). "Mobile Application Services New library." Astane Gods Razavi **5**(18).
3. Aungst, T., K. Clauson, et al. (2014). "How to identify, assess and utilise mobile medical applications in clinical practice." International journal of clinical practice **68**(2): 155-162.
4. Behbahani (2010). "Application of telemedicine, The doctor's touch from Long-distance / Telemedicine from yesterday to today " Journal of Biomedical Engineering and Laboratory Equipment. **9**(104): 25-38.
5. Boruff, J. T. and D. Storie (2014). "Mobile devices in medicine: a survey of how medical students, residents, and faculty use smartphones and other mobile devices to find information." Journal of the Medical Library Association: JMLA **102**(1): 22.
6. Davies, B. S., J. Rafique, et al. (2012). "Mobile Medical Education (MoMEd)-how mobile information resources contribute to learning for undergraduate clinical students-a mixed methods study." BMC medical education **12**(1): 1.
7. Didegah , F. K. M. (2009). "Application of new technologies Library services to Physical disability." Monthly information seeking and information science **3**(20): 16-25.
8. Dresselhaus, A. and F. Shrode (2012). "Mobile technologies & academics: do students use mobile technologies in their academic lives and are librarians ready to meet this challenge?" Information Technology and Libraries **31**(2): 82-101.
9. Guy, R., J. Hocking, et al. (2012). "How Effective Are Short Message Service Reminders at Increasing Clinic Attendance? A Meta-Analysis and Systematic Review." Health services research **47**(2): 614-632.
10. Hajiha (2009). "New approaches of libraries to non-book technologies." Faslname Ketab **80**: 97-118.
11. Hardyman, W., A. Bullock, et al. (2013). "Mobile technology supporting trainee doctors' workplace learning and patient care: an evaluation." BMC medical education **13**(1): 6.
12. Iwhiwhu, B. E., J. O. Ruteyan, et al. (2010). "Mobile phones for library services: prospects for Delta State University Library, Abraka."
13. Karim, N. S. A., S. H. Darus, et al. (2006). "Mobile phone applications in academic library services: a students' feedback survey." Campus-Wide Information Systems **23**(1): 35-51.
14. Klatt, C. A. (2011). "Going mobile: free and easy." Medical reference services quarterly **30**(1): 56-73.
15. Krishnan , Y. (2010). "Libraries and the mobile revolution."
16. Kwee Choy Koh, M., J. K. Wan, et al. (2014). "Medical students' perceptions regarding the impact of mobile medical applications on their clinical practice." Journal of Mobile Technology in Medicine **3**(1): 46-53.
17. Lubega, J., R. McCrindle, et al. (2004). Uses of mobile phones in higher education. World Conference on Educational Multimedia, Hypermedia and Telecommunications.
18. Nundy, S., C.-Y. E. Lu, et al. (2014). "Using Patient-Generated Health Data From Mobile Technologies for Diabetes Self-Management Support Provider Perspectives From an Academic Medical Center." Journal of Diabetes Science and Technology **8**(1): 74-82.
19. Sharif (2010). "Personal digital assistants PDA applications in libraries and information centers." " World Telecommunication **37**(4): 42.
20. Tahamtan , i. S. S. (2011). "The Use of Personal Digital Assistants and Smartphones to Access Health Information." Payavard Salamat **5**(4): 57-65.

21. Wang, C.-Y., H.-R. Ke, et al. (2012). "Design and performance evaluation of mobile web services in libraries: A case study of the Oriental Institute of Technology Library." Electronic Library, The **30**(1): 33-50.
22. West, D. M. (2013). "Mobile Learning: Transforming Education, Engaging Students, and Improving Outcomes." Mobile Learning: Transforming Education and Engaging Students and Teachers. Center for Technology Innovation at Brookings, Washington, DC **17**.
23. Zamani, B. E., H. Babri, et al. (2012). "Factors associated with medical students' attitudes of With the adoption of mobile learning Using the Technology Acceptance Model.
24. ." Strides in Development of Medical Education **9**(2).