Mobile devices and applications literature review sample

Health & Medicine, Healthcare

Literature Review on Mobile Healthcare

Literature Review on Mobile Healthcare

In the field of health, the use of advanced technology is not anymore limited to highly specialized branches such as medical robotics or nuclear medicine. Different levels in the healthcare delivery system have utilized the benefits and convenience offered by mobile devices. Mobile healthcare or mHealth is slowly gaining ground in health facilities worldwide. The term mHealth refers to " the use of wireless communication devices to support public health and clinical practice" (Kahn, Yang, & Kahn, 2010, as cited in Barton, 2012). In the succeeding sections the terms mHealth and mobile healthcare will be used interchangeably.

Smart phones are now basic tools of communication. These devices are also becoming a common sight among health practitioners, often tucked alongside the stethoscope during the doctors' rounds. Both healthcare providers and health consumers make use of their mobile phones to communicate important health-related information, especially those requiring immediate decisions. This development is not surprising since use of the mobile phone has already reached epic proportions. In the US alone, statistics from the CDC show that young adults reside in homes without landlines, only mobile phones (Boulos, Wheeler, Tavares & Jones (2011). The basic function of a regular mobile phone can be tapped for health-related activity. Text messages may be sent to motivate the smoker to quit smoking facilitate, educate the user about diabetes, and remind about primary care appointments (Klasnja & Pratt, 2012).

However, the release of smartphones/androids, which have become increasingly affordable, have ushered in more ways to access mHealth. By downloading health apps or health mobile applications, users are able to utilize their smartphones for a variety of tasks, from the simple reminder to take their medication to more life-saving functions such as detecting an imminent heart attack. Mobile medical applications are “ applications on a wireless device that are used as accessories to medical devices or to convert a mobile platform to a medical device” (Barton, 2012, p. 46). The popularity of such applications is attested by statistics that showed billion downloads of health apps took place in 2010 (Mobile Future 2010 as cited in Boulos, Wheeler, Tavares & Jones, 2011). Studies about specific health apps used in mHealth are likewise increasing and many of these are already about specific functions available through the smartphone. According to Boulos et al., the use of on-board digital diaries was investigated by Burton, Weller & Sharpe in (2007); the use SMS texts in behavior change was the focus of Fjeldsoe, Marshall & Miller (2009); patients’ cooperation in antiretroviral treatment was assessed by Pop-Elecheset al. (2011), and the comparison of mobile phone records with traditional paper based records in controlled drug trials was the subject of inquiry of Lane, Heddle, Arnold, & Walker (2006). Hii & Chung (2011) focused their study on the use of the Android smartphone for ECG monitoring because they believe that the “ mobile device in ubiquitous healthcare must be an ultra compact, low cost, light weight and low power consumption unit to achieve the optimal outcome” (p. 6802). The Android smart phone fits these characteristics. According to the researchers, the Android phone serves as the monitoring terminal while the

wireless technology sends the data to the health practitioner. They are convinced that the monitoring terminal (Android device) can detect underlying heart conditions and would be very important in persons recovering from heart attacks.

A specific example of a mobile health application for Android smart phone is the eCAALYX an acronym for Enhanced Complete Ambient Assisted Living Experiment. The aim of the eCAALYX project was to develop a remote monitoring system that would be used by older people who are confronted with multiple chronic diseases. Through the eCAALYX platform, information about the health status of the patient, including alerts and measurements, will be sent to the health practitioner. The data comes from sensors that are in place in the garment of the patient. The mobile device sends these data (Boulos, et al, 2011).

Effectiveness of mobile health technology

Klasnja & Pratt (2012) enumerated the reasons why mobile phones can be effective in health interventions. These are due to:

- the widespread adoption of phones with increasingly powerful technical capabilities;

- people’s tendency to carry their phones with them everywhere;

- people’s attachment to their phones; and

- recent context awareness features that can be enabled through sensing and phone-based personal information” (p. 185).

Since the majority of adults in the US, and even worldwide, have access to a mobile phone, this device can indeed be utilized to increase the access to

healthcare. To measure the effectiveness of mobile health, the researchers Free, Phillips, Galli, Watson, Felix, Edwards, Patel, & Haines (2012) conducted a systematic review of all published controlled trials of mobile technology-based health interventions for the period of January 1990 to September 2010. The results of their study showed that ” text messaging interventions increased adherence to ART” (Abstract). They also suggested that smoking cessation become a part of the mobile health services.

In South Africa, a mobile application known as Mobilize was piloted to assist health care workers in their tasks of monitoring patients afflicted with multi-drug resistant tuberculosis (MDR-TB). The objective of this study was to examine whether the use of Mobilize was acceptable and feasible. The apps was used to record and submit weekly the adverse events forms during the implementation of the MDR-TB therapy. This pilot project undertaken by Chaiyachati, Loveday, Lorenz, Lesh, Larkan, Cinti, Friedland & Haberer (2013) also collected information about the health workers’ perceptions during the project period. According to the healthcare workers, “ Mobilize improved adverse events communication, helped their daily workflow, and could be successfully expanded to other health interventions” (Abstract).

Acceptability of mobile healthcare

Every time a new method in healthcare is introduced, it is important that such method is accepted or recognized by its users. In the case of mHealth, gathering the perspectives of various stakeholders would be a worthy exercise. Doing so would provide information from the health care providers,

healthcare consumers, as well as the other organizations like the health insurers. In the study of Kuo, Liu & Ma (2013), they investigated the effect of the technology readiness of nurses on their acceptance of mobile electronic record systems. They found out that nurses were not very comfortable with technology. The researchers therefore suggested that nurses be provided with opportunities to learn more about information technology to lessen their stress and discomfort in using newly-introduced technical programs such as the mobile electronic medical record (MEMR) systems.

Studies about perceptions of specific sectors about mHealth have also been undertaken. One of which is that launched by Palmier-Claus, Rogers, Ainsworth, Machin, Barrowclough, Laverty, Barkus, Kapur, Wikes, & Lewis (2013) which looked into how the use of mobile devices to assess mental health would be received by patients suffering from schizophrenia. The results of the study showed that the patients were aware of the advantages of using mobile phone-based assessment. They also recognized that it is possible for the technology to be integrated into their daily tasks. The researchers pointed out that patients need to be made aware of the benefits of the technology at both the theoretical and personal levels.

In another study, the one conducted by Chaiyachati et al. (2013), there was a high acceptability of the mHealth among its users, however, their pilot project had poor uptake. The researchers therefore suggested that motivations of healthcare workers be assessed before the mHealth initiatives are scaled up in resource poor areas. Different economic settings may also be a factor in the acceptability of the mobile healthcare.

Conclusions

The preceding paragraphs show that mobile healthcare is a significant research topic. There exists numerous studies that look at various aspects of this new phenomenon. This researcher limits its review to only three areas of mobile healthcare: (a) devices and applications; (b) effectiveness of the mobile technology; and (c) acceptability of mHealth. These collected documents appear to already be sufficient guide for the next steps in this research paper.

References

Barton, A. J. (2012). The regulation of mobile health applications. BMC Medicine, 10 (46). doi: 10. 1186/1741-7015-10-46. Retrieved from http://www. ncbi. nlm. nih. gov/pmc/articles/PMC3364852/

Boulos. M. N. K., Wheeler, S., Tavares, C. & Jones, R. (2011). How smartphones are changing the face of mobile and participatory healthcare: An overview, with example from eCAALYX. Biomed Engineering OnLine, 10 (24). doi: 10. 1186/1475-925X-10-24. Retrieved from http://www. ncbi. nlm. nih. gov/pmc/articles/PMC3080339/

Chaiyachati, K., Loveday, M., Lorenz, S., Lesh, N., Larkan, L., Cinti, S., Friedland, G. & Haberer, J. (2013). A pilot study of an mHealth application for healthcare workers: Poor uptake despite high reported acceptability at a rural South African community-based MDR-TB treatment program. PLoS ONE 8(5): e64662. oi: 10. 1371/journal. pone. 0064662. Retrieved from http://www. ncbi. nlm. nih. gov/pmc/articles/PMC3665589/? report= classic.

Free, G., Phillips, G., Galli, L., Watson, L., Felix, L., Edwards, P., Patel, V. &

Haines, A. (2013). The Effectiveness of mobile-health technology-based health behaviour change or disease management interventions for health care consumers: A systematic review. PLoS Med, 10 (1): e1001362. doi: 10. 1371 Retrieved from http://www. ncbi. nlm. nih. gov/pmc/articles/PMC3548655/pdf/pmed. 1001362. pdf

Hii, P. & Chung, W. (2011). A comprehensive ubiquitous healthcare solution on an Android™ mobile device. Sensors, 11, pp. 6799-6815; doi: 10. 3390/s110706799. Retrieved from http://www. ncbi. nlm. nih. gov/pmc/articles/PMC3231662/

Klasnja, P. & Pratt, W. (2012). Healthcare in the pocket: Mapping the space of mobile-phone health interventions. Journal of Biomedical Informatics, 45 (1), pp. 184-198. Retrieved from http://www. ncbi. nlm. nih. gov/pmc/articles/PMC3272165/.

Kuo, K. M., Liu, C. F. & Ma, C. C. (2013). An investigation of the effect of nurses' technology readiness on the acceptance of mobile electronic medical record systems. BMC Medical Informatics and Decision-Making, 13: 88. Retrieved from http://www. biomedcentral. com/1472-6947/13/88.

Palmier-Claus, J. E., Rogers, A., Ainsworth, J., Machin, M., Barrowclough, C., Laverty, L, Barkus, E., Kapur, S., Wikes, T. & Lewis, S. W. (2013). Integrating mobile-phone based assessment for psychosis into people’s everyday lives and clinical care: a qualitative study. BMC Psychiatry 13: 34. doi: 10. 1186/1471-244X-13-34. Retrieved from http://www. biomedcentral. com/1471-244X/13/34.