Would mHealth be a Solution to Rehospitalization? Alice

Hong Tao[1], Susan McRoy[2], Carol Hall Ellenbecker[3], Lin Wang[4]*

[1]Florida Hospital Clinical Excellence and Nursing Research, FL, USA
[2]College of Engineering & Applied Science, University of Wisconsin-Milwaukee, WI, USA
[3]College of Advancing and Professional Studies, University of Massachusetts Boston, MA, USA
[4]School of Nursing, Shanghai Jiaotong University, Shanghai, People's Republic of China

Brief Communication

ABSTRACT

For patients receiving home health care services, it has been well-established that social environmental factors can increase the risk of rehospitalization, particularly when an informal caregiver is providing most of the care. However, universal access to more formal caregiving is unlikely, given the numerous economic and political barriers. As an alternative, one must consider increasing the use of mHealth technology to enhance the skills of informal caregivers and to improve the communication between home and clinical care. Here we discuss what our recent findings suggest would be most beneficial and what potential barriers must be addressed.

BACKGROUND

Home health care patients' rates of rehospitalization within 30 days after discharge have been consistently high with the rates for Congestive Heart Failure, Chronic Obstructive Pulmonary Disease, Diabetes, End Stage Renal Disease and Chronic Kidney Disease being 22.7%, 20.7%, 20.3%, 35.2% and 24% respectively [1]. Many hospitalizations are believed to be avoidable and better treated outside the hospital [2]. In 2012, our research team focused on the critical importance of social environment factors on maintaining home health care patients in their homes. Using data from Medicare-required assessments among 1,268 elderly patients receiving home healthcare, found "Informal caregivers are part of the solution in preventing unnecessary hospitalizations and more attention needs to be given to how these caregivers are supported in their roles [3]. This is so true in the United States, with the aging of the baby boomer generation and projected shortages among formal healthcare providers, informal caregivers represent "the backbone of the long-term care system" for the aged and chronically [4].

ROLE OF INFORMAL FAMILY CAREGIVERS FOR REHOSPITALIZATION

To further explore the role of informal family caregivers and the most critical problems associated with rehospitalization, the authors interviewed 15 home healthcare experts. Two critical problems associated with re-hospitalization were most frequently identified: a) family caregivers' inability to recognize when to alert health care providers of a change in condition; and b) ineffective communication between healthcare providers and patients/families. Specific problems reported by the senior visiting nurses and case managers included: a) the paper-based education information for patients or families was too overwhelming for them, resulting in an inability or unwillingness to follow the material; b) the traditional communication through home visiting and phone calls were not effective in promptly identifying early health problems or changes in symptoms. This preliminary study provides critical information suggesting that effective use of information technology, especially a mobile health (mHealth) application (APP) is needed to help caregivers identify patients' health problems, such as worsening symptoms, in a timely manner so as to prevent unnecessary re-hospitalization. This study also, from the home healthcare expert's perspective, reaffirms the important role of informal caregivers in maintaining home healthcare patients.

Research & Reviews: Journal of Nursing & Health Sciences

PERFORMANCE AND USABILITY OF MHEALTH BY INFORMAL FAMILY CAREGIVERS

mHealth APPs include the use of mobile communication devices such as mobile phones and, Tablet computers (e.g. iPads) to collect and provide information for health services, real-time monitoring of patients' vital signs, and direct provision of care (via mobile telemedicine) [5]. Mobile-based health information software offers the potential for supporting family caregivers of those who are homebound or have difficulty accessing health care centers. A national survey reported that 79 percent family caregivers had access to the internet using desktops and/or mobile devices [6]. However, a study by the National Family Caregiver Support Program (NFCSP) showed that many informal family caregivers caring for someone aged 65+, the average age is 63 years with one third of these caregivers suffering poor health, which led to the concern that theses caregivers may not be appropriate for using mHealth required mobile device [7].

To assess the validity of this concern, our research team conducted a study of the performance of computer tablets among typical family caregivers caring for older adults and their perceived usability [8]. The multi-part study was conducted with 100 caregivers aged 55 and above, comprising a short written survey, a practice-based observation, and a follow-up survey combining standard usability items and open-ended questions. The results show the target population would indeed be willing and physically able to adopt new tablet-based software, but participants' attitudes about the complexity of tablets and software present a likely barrier. The results of the study suggest that information and training be provided to address caregiver concerns before the introduction of any new mHealth intervention.

CRITICAL FUNCTIONALITY FOR A MHEALTH INTERVENTION: TRACK AND TRIGGER

The Healthcare Information and Management Systems Society (HIMSS), a global organization focused on better health through information technology, conducted its 2015 Mobile Technology Survey and reported that healthcare organizations were widely beginning to utilize mobile technologies to engage patients. Research on smartphone apps reveals that 20 percent of the app-user rehab patients experienced readmission compared to 60 percent of patients who completed rehab only. Our research also revealed that informal caregivers express strong interest in having a caregiving support mHealth App to support his/her caregiving role [8-10]. Particularly, they reported that they would like use the mHealth APP to obtain relevant medical knowledge to help caregiving, track personal health records, communicate with professional caregivers, administer medication, and get useful information for the caregiver themselves for a concerning health problem. This data is consistent with our previous qualitative study findings, as described above, that caregivers need support to identify patients' health problems and communicate with healthcare providers in a timely manner so as to prevent unnecessary rehospitalization.

The type of system needed is one of track and trigger – this type of system allows the caregiver to track important vital signs or tasks by recording or viewing them using the APP and the APP will also compare the stored values and other information against pre-established patterns and trigger an alert when the emerging sequence suggests a need for caregiver action. While this might be similar to a provider-controlled portal, a personally-controlled APP offers both access for those whose providers do not offer such a portal, and the potential for an increased sense of autonomy and engagement. With informal caregivers, such factors are also important for acceptance. In another of our recent studies on technology preferences of informal caregivers we found that features associated with autonomy, relatedness and competency – factors often associated with intrinsic motivation by social scientists were most frequently desired [11,12]. The Track and Trigger system our research team has been working on is designed to help informal caregivers of patients with comorbid problems track specific symptoms to identify early signs of a possible change in condition. Event flags then trigger notification of the caregiver and health care personnel, when further communication and action is needed. The comorbid problems considered in this Track &Trigger intervention include cognitive impairment, heart failure (HF), diabetes, infection (primarily pneumonia, urinary tract, and soft tissue), and chronic obstructive lung disease (COPD) that are associated with rapid readmissions. To ensure the caregiver will be able to utilize the system, an inter-rater reliability test between informal caregiver and healthcare provider will be conducted after appropriate educating and training the caregivers. Our very preliminary inter-rater reliability test revealed a greater than 0.90 inter-rater reliability.

CONCLUSION

Preventable rehospitalization represents a huge burden-both financially and in terms of the quality of life of the elderly and their caregivers [13]. mhealth technology offers a promising way to reduce this burden but has been underutilized by the family caregivers who might benefit most. Recent research suggests that the keys to achieving the potential benefits will be to address factors associated with motivation, including competency, autonomy, and relatedness. Software must be well-designed so that recording health information, understanding it and sharing it with others is easy. Providers and public health workers can help by providing training.

REFERENCES

1. Betancourt JR, et al. Guide to preventing readmissions among racially and ethnically diverse medicare beneficiaries. Prepared by the Disparities Solutions Center, Mongan Institute for Health Policy at Massachusetts General Hospital. Baltimore, MD: Centers for Medicare & Medicaid Services Office of Minority Health. 2015.

2. Hallgren J, et al. Factors associated with increased hospitalisation risk among nursing home residents in Sweden: A prospective study with a three-year follow-up. International Journal of Older People Nursing. 2016;11:130-139.

3. Tao H, et al. The influence of social environmental factors on rehospitalization among patients receiving home health care services. Advances in Nursing Science. 2012;35:346-358.

4. National Alliance for Caregiving. Caregiving in the US. AARP; Bethesda, MD: The National Alliance for Caregiving. 2005.

5. Cipresso P, et al. Is your phone so smart to affect your state? An exploratory study based on psychophysiological measures. Neurocomputing. 2012;84:23-30.

6. Fox S and Maeve D. "Mobile health 2012." Pew Internet and American Life Project. 2012;8.

7. Administration on Aging National Family Caregiver Support Program (FCSP). 2004.

8. NIMSS. 2015 HIMSS Mobile Technology Survey. 2015.

9. Mayo Clinic. Mobile apps helping reduce readmissions. 2014.

10. Tao H, et al. Performance and Usability of Tablet Computers by Family Caregivers in the United States and China. Research in Gerontological Nursing. 2016;9:183-192.

11. Alkushayni S and McRoy S. MHealth technology: Towards a new mobile application for caregivers of the elderly living with multiple chronic conditions (ELMCC). Proceeding of the Sixth International Conference on Digital Health, Montreal Canada. 2016.

12. Peng W, et al. Need satisfaction supportive game features as motivational determinants: An experimental study of self-determination theory guided exergame. Media Psychology. 2012;15:175-196.

13. Geyer S. Mobile apps helping reduce readmissions. 2015.