Personal Question

Your work focuses on patient education to reduce readmissions. You've discussed the general potential for this, but for the personal question, drill down into the potential more specifically if possible: is there data surrounding what percentage of readmissions were avoidable with behavioral changes from the patient? What kind of impact can you expect to make on this percentage? If such data is not available, comment instead of connecting to patient motivations. Aftercare is a high-stress, high-cognitive load time for patients: how will you ensure your system is helpful instead of overwhelming? (David)

What are some triggers that a patient may face that discourage positive behavioral changes of the patient? How will your system impact those patients who become dependent or disabled in any capacity? (Tia)

The role of patient education in reducing readmission rates

What data surrounding what percentage of readmissions were avoidable with behavioral changes from the patient?

Patient's behavioral change can be achieved through patient education. Patient education is only one of the components of many integrated solutions proposed to reduce readmission rates. Boutwell et al [1], in their survey of published literature to review the evidence for effective interventions to reduce re-hospitalisations state that many re-hospitalisations are avoidable and report that as many as 35% of the readmissions can be avoided by implementing patient education and self-management support.

FierceHealthcare Custom Publishing [2] citing Bryan et al [3], estimate that 6% of all readmission can be avoided by only making behavioral changes though patient education (20% readmission rate, 30% of those readmissions can be avoided by educating patients). If we consider that they estimate the total cost of readmissions to be $15 billion a year, the 6% represent and astonish $960 million a year!

The importance of the proposed project

What kind of impact can you expect to make on this percentage?

Giving the lack and need of an EdTech framework tailored to educate patient, I can expect that a well-defined EdTech framework can have a high rate of adoption. If we consider a conservative 20% adoption rate, the proposed framework can help reducing 1.2% of the total readmission rates, equivalent to healthcare reduction cost of $180 million per year. Developing a well architected education technology framework based on the best of breed components of the existing LMS can have a bigger impact on the total readmission rate.

My project will focus in analysing the existing LMS with the goal of identifying the best components to be integrated in a patient education system. During my research I have been able to identify some gaps in the existent solutions and how to overcome those gaps. The lacking of adaptive learning components in educating patients and the limited use of feedback mechanisms are two examples of those gaps.

Challenges

Aftercare is a high-stress, high-cognitive load time for patients: how will you ensure your system is helpful instead of overwhelming?

It is a well-known fact that the aftercare period is a high stress period. Harlan M. Krumholz, M.D. [4] describe this as Post-Hospital Syndrome (PHS) and stated that "On the cognitive front, hospitalized patients often meet a variety of health care professionals but have little time to learn their names or understand their roles. Schedules are often unpredictable, and in patients who are already under stress, information overload can be stressful and may even provoke confusion. Moreover, these stressors of hospitalization can cause delirium, which is associated with increased risk after discharge."

A patient education system framework must take into consideration the high level of stress after a period of hospitalization and the effect in the cognition functions.

Niculescu et al [5], conducted an experiment in the interaction of stress level and cognition. As part of their experiment they manipulated six different parameters to induce variation on the level of stress, such as background noise, speech speed, speech length, time limitation, simulated recognition mistakes and dramatic event description. The experiment demonstrated that using calmly and clear voice with normal speed, describing the situation as being under control and not urging the subject to speed up their performance helped to maintain lower level of stress. They also did cognitive load manipulation using two parameters: task complexity and presentation format. The experiment demonstrated that well defined instructions and lower complexity tasks where better assimilated during high stress conditions.

Based on the previous cited researches, and to ensure the proposed framework will serve as guidance for building helpful and not overwhelming patient education learning systems, the EdTech components of the proposed framework must be carefully selected to:

1. Be simple to understand,
2. Include clear instructions and,
3. Control the number of simultaneously information elements presented at any given time.

The information must be presented at slow pace to allow the working memory to transmit then to long term memory. Adaptive algorithms must be used to gradually increase or decrease the presentation pace and simultaneous number of information elements to the perceived cognitive level of the patient.

EdTech clearly represent an advantage in this area. It allows information repetition and adapting presentation pace and format to maximize learning at the perceived cognition level of the patient. The proposed framework will take this into consideration.

What are some triggers that a patient may face that discourage positive behavioral changes of the patient?

Complexity of the educational material is possible the most discouraging factor for positive behavioral change of patients. As stated in the response of the previous answer, the material used must be easy to understand and well designed. The EdTech tool must be able to perceive the current cognitive level of

the patient and adapt the learning accordingly.

Change in life time habits is another factor that discourages positive behavioral changes. For the learning experiences to be successful, it must be carefully planned. Effective ways of presenting the information must be identified. Adaptive learning is a good tool to address this issue.

How will your system impact those patients who become dependent or disabled in any capacity?

The proposed framework will include caregivers' education. Caregivers, like family members, needs to know how to take care of dependent or disabled patients. The education provided to caregivers should include, but not be limited to, basic care procedures and identification of basic symptoms requiring immediate medical attention. Brookman et al conducted and study in collaboration with caregivers, representatives of current programs, and stakeholders; they identified 20 promising practice indicators for caregiver education and support programs.[6] One of the identified indicators is directly related to educating caregivers, and 8 others indicators can be related to education technology. The framework should also include a communication component that allows caregivers to communicate with care plan managers and health care professional.

References

[1] Boutwell, A. Hwu, S. *Effective Interventions to Reduce Rehospitalizations: A Survey of the Published Evidence.* Cambridge, MA: Institute for Healthcare Improvement; 2009.

[2] FierceHealthcare Custom Publishing, " REDUCING HOSPITAL READMISSIONS WITH ENHANCED PATIENT EDUCATION", retrieved from https://www.bu.edu/fammed/projectred/publications/news/krames_dec_final.pdf

[3] Brian W. Jack, MD, Veerappa K. Chetty, PhD, David Anthony, MD, MSc, et al, "A Reengineered Hospital Discharge Program to Decrease Rehospitalization," Annals of Internal Medicine 150(3), Feb. 3, 2009, pp. 178-187, http://www.annals.org/content/150/3/178. abstract

[4] Harlan M. Krumholz, M.D., "Post-Hospital Syndrome — An Acquired, Transient Condition of Generalized Risk", N Engl J Med 2013; 368:100-102January 10, 2013DOI: 10.1056/NEJMp1212324, http://www.nejm.org/doi/full/10.1056/NEJMp1212324

[5] Andreea Niculescu, Yujia Cao, and Anton Nijholt, "Manipulating Stress and Cognitive Load in Conversational Interactions with a Multimodal System for Crisis Management Support", Human Media Interaction, University of Twente

[6] Brookman, C., Holyoke, P., Toscan, J., Bender, D., Tapping, E. Promising practices and indicators for caregiver education and support programs. Markham, ON: Saint Elizabeth, 2011.

http://www.ihi.org/topics/readmissions/Pages/default.aspx

http://www.ihi.org/resources/Pages/Publications/EffectiveInterventionsReduceRehospitalizationsASurveyPublishedEvidence.aspx

http://theelearningcoach.com/learning/20-facts-about-working-memory/

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3951368/