Designing a Cardiovascular Surgical Web-based Patient Education Intervention: A Discussion Paper

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Abstract

The effectiveness of written education materials have been examined across the cardiovascular surgical setting. Inconsistent findings have indicated minimal changes to patient outcomes. The absence of significant findings may be due to the lack of control patients have over the frequency in which they can access information, the amount and type of content they are able to peruse, and the actual time the materials can be reviewed. A complement to in-hospital patient educational interventions is web-based patient education, accessed during the home discharge period. This discursive paper presents a summary of a planned web-based patient education intervention that has been designed for use by a predominantly elderly population. In particular, modifications to account for reduced visibility, decreased hearing, and onset of physical impairment are discussed.

Keywords: elderly, patient education, self-care, web-based teaching

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Within the cardiovascular surgical population, patient education interventions are used to promote the engagement in self-care behaviours.[1] This education is typically presented in the form of written materials. The content is generated from a thorough review of the literature relating to patients' identified learning needs and addresses the following topics: medication, healthy heart diet, activity, signs and symptoms of infection, incision care, and complications.[1] Patient education varies in its delivery in that it can be presented either in its entirety or based on the individual's perceived learning need at a particular point in time.[2-3]

The effectiveness of written education materials have been examined across the cardiovascular surgical setting.[1, 4-6] Inconsistent findings have indicated minimal changes to knowledge,[1, 4-6] performance of self-care behaviours,[1,6] and symptom experiences[1,6]. The absence of significant findings may be due to the lack of control patients have over the frequency in which they can access information, the amount and type of content they are able to peruse, and the actual time the materials can be reviewed.

A complement to in-hospital patient educational interventions is web-based patient education accessed during the home discharge period because of the potential to offer real-time support.[7] Web-based educational interventions are used as a medium to promote the exchange of patient education information and engagement in self-care behaviours during the post-hospital discharge recovery period.[8] This type of intervention provides a means through which nurses can communicate with patients outside of the acute care setting.

However, designing web-based educational interventions for delivery of self-care instructions following hospital discharge may prove to be challenging for the majority of cardiovascular surgical patients, as the average age of these individuals is 69.3 (± 3.9) years.[9] Developmentally, these patients are characterized as elderly. As such, they may be prone to the development of functional limitations such as visual, hearing, and cognitive impairments, and have reduced hand and motor coordination.[10] These factors serve to influence not only the effectiveness, but the design and implementation of web-based patient education programs.

This discursive paper will present a summary of a planned web-based patient education intervention. The challenges associated with its forthcoming design and implementation; along with specific strategies to promote its use will be discussed. The paper will begin with a brief summary of the literature associated with web-based patient education interventions. This will be followed by a presentation of the planned intervention; along with specific strategies that will be used to promote patient engagement.

Effectiveness of web-based patient education interventions

Consistently, use of the internet for information delivery has been shown to be a cost-effective means for delivering specialized health care services to patients following hospital discharge.[11] An estimated benefit-cost ratio of 3.65 was identified in terms of incremental morbidity cost savings of $160,000 when the internet was used to deliver patient education interventions.[11] Monetary value reflects direct costs associated with increased number of physician consultations, treatments, and emergency room visits.

Further, evidence suggests that patients who received educational materials via the internet reported better outcomes than patients who received educational interventions using other media.[11] Specifically, a statistically significant decline ($p < .05$) in the number of physician consultations (-44%), emergency room visits (-67%), and days off school and/or work (-71%) was noted in patients who received education through the internet.[12] Currently, a web-based patient education intervention is being considered for development.

Planned web-based patient education intervention

The planned web-based educational intervention will provide information related to the performance of post-operative cardiovascular self-care behaviours. Individuals will be able to access this information to assist them in their overall recovery experience. It is anticipated that the individual will be able to access, understand, retain, and recall necessary self-care information, of which they will then be able to use to decrease and/or prevent the onset of symptoms and complications during their home recovery experience.

Increased engagement in self-care patient education behaviours will most likely decrease the development of symptoms and complications resulting in a reduced likelihood of hospital readmissions.[13-14] The educational content will be based on a comprehensive review of the literature regarding the learning needs of the post-discharge cardiovascular surgical patients, as identified within the first three months of hospital discharge. Topic areas that will be addressed are: complications, activities, medication, symptom management and control, and psychological symptoms. Patients will be able to select topics that they deem relevant to their specific learning needs at a particular point in time. They will have unlimited access to this website over the course of the first three months of their post-hospital discharge.

Challenges and strategies for designing web-based cardiovascular surgical patient education interventions

In order to effectively design a web-based cardiovascular surgical patient education intervention, specific age-related indications need to be addressed. In particular, around the age of 50, hearing starts to decline and can affect an individual's ability to discern audio and filter out background sounds.[15] As well, during a person's mid-40's vision typically starts to deteriorate, while significant vision loss, which can impede one's everyday function, occurs in approximately 16% of individuals between the age of 65 to 74.[15] This can lead to challenges in one's ability to focus on near tasks such as viewing a computer screen as well as registering changes to colour perception and sensitivity such that blue and green colours become difficult to see, with reds and yellows being easier colours to distinguish. As individual ages, their pupils shrink resulting in decreasing contrast sensitivity, and thus there is the need for the use of higher contrasts.[16]

With regards to physical impairment, the elderly are more likely to develop arthritis, tremors, and chronic pain; making it difficult to use a mouse or keyboard, click small targets, and experience strain from non-ergonomic tasks.[16] Dementia and various degrees of cognitive impairment can also lead to short-term memory loss, which may result in an individual not remembering the purpose for their visit on the website, loss of orientation, becoming easily distracted from movement or encounter, and difficulty in coping with irrelevant material.[16] Short-term memory loss is of particular importance within the post-operative cardiovascular surgical population as just over a quarter of all cardiovascular surgical patients typically experience some form of cognitive impairment resulting in short-term memory loss, which may last up to 6 months post-operatively.[17]

To a lesser extent, a proportion of elderly individuals may not be proficient with technology and may require some form of training or interactive exercise in order to be comfortable with using online resources.[18] Thus, it is imperative that the intended web-based patient education program be designed to account for the needs of the target population of interest. The following is a presentation of the specific design considerations that will be made during the configuration of an online patient education program.

Design considerations

To address the challenges faced by users who may be experiencing some form of impairment, are not proficient in using computers, or are not comfortable with technology; readable and understandable texts will be used. The choice of font will be clear (such as Arial or Bookman Old Style), with larger font size options (either 14 or 16) being provided. This will allow for those with visual impairments to easily navigate through the education program. The text will be simple and clear to enhance comprehension and ease of navigation.

A high contrast (between dark and light colours) will be used for text and other important information; with minimal reliance on colour as an indicator for information. The use of icons will be simple with clear, defining symbols used sporadically throughout the educational interaction. Furthermore, links will be clearly distinguishable from the regular text. Links will be underlined to distinguish it from other web-based content; and their purpose will be explained in clear and readable language. The design of large targets or boxes will be embedded into the webpage to allow for increased area for use of the mouse or keyboard for clicking. The headings will clearly identify the sections to follow and will stand out from the text by using bold font. The layout will be consistent across the site which will help with recognition and facilitate ease of use.

The text will be presented using left justification so it will be easy to read. Increased line spacing and avoidance of the use of italics will be used to further facilitate reading and navigating across the website.

Alternatives for different tasks will be provided to accommodate for any potential difficulty associated with navigating through the website. Thus, the intervention will be designed to allow for the use of the mouse or keyboard in selecting different links and/or targets.

Resources in the form of talking browsers (i.e. voice browsers) will be embedded into the design of the web-based intervention, to assist with reading the text aloud on websites. As well, the design of the browser will block potentially distracting content such as pop-up windows and animations. A help menu, a phone number to an on-call nurse, and a link to an email window will be made available should the patient require assistance. Error messages with explanations of cause and possible solutions will be embedded throughout the design of the web-based education.

Finally, as part of the initial training for use of the website, a copy of the keyboard, including a description of key functions that will assist in the use of the website will be provided to all patients prior to their hospital discharge. This web-based educational intervention will be designed with input obtained from a sample of users and will be evaluated for ease of use, relevance, and feasibility prior to its implementation.

Acknowledgement

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