Introduction

Internet based educational interventions are used as a medium to promote the exchange of patient education information (Webb, Joseph, Yardley & Michie, 2010). In particular, this type of intervention provides a means through which nurses can communicate with patients outside of the healthcare arena. 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 (Runge, Lecheler, Horn, Tews, Schaefer, 2006). Specifically, an estimated benefit-cost ratio of 3.65, was identified in terms of incremental morbidity cost savings of $160,000 (monetary value reflects direct costs associated with increased number of physician consultations, treatments, and emergency room visits), when the internet was used to deliver patient education interventions (Runge et al.).

Furthermore, evidence suggests patients who received educational materials via the internet reported better outcomes, than patients who received educational interventions delivered using other media (Runge, Lecheler, Horn, Tews, & Schaefer, 2006). 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.

In Canada, approximately 81.6% of the population have access and are constantly using the internet (Internet World Statistics, 2012). One of the main purposes for internet use is to search for information. The Internet World Statistics (2012) identified approximately 71% of all internet users have already accessed the internet to search for health related information, seek self-help tools, or interact with a health care professional. Thus, using the internet to deliver patient education materials appears to be an appropriate means in which to communicate with patients outside of the formal health care arena (i.e. institutional settings).

Moreover, there is growing evidence to support the effectiveness of internet based interventions particularly in terms of empowering patients to engage in self-regulatory behaviours such as self-care (Scholten, Cousineau, & Tuil, 2010). Patient empowerment has been identified as a necessary component of health and refers to an individual's enhanced ability to understand and enact changes to their overall health and well-being (Scholten et al.). An individual's level of empowerment can be influenced by any number of factors that may include: psychotherapy, counselling, education, and psycho-educational interventions. However, the effect of these interventions is dependent on how they are delivered (Scholten et al.). Studies have examined face-to-face, group sessions, leaflets and pamphlets, telephone, and internet based interventions designed to promote empowerment in patients following invasive procedures (Scholten et al.). Results suggested delivering interventions through face-to-face or by telephone may reduce depression and anxiety in patients; however internet based interventions have led to significant increases in levels of empowerment resulting in enhanced performance of self-care behaviours (Scholten et al.).

Within the cardiovascular surgical environment, education is provided for all patients to promote the engagement in self-care behaviours following hospital discharge (Jaarsma, Halfens, Abu-Saad, Dracup, Diederiks, Tan, 2000). This education is commonly presented through face-to-face interaction, written materials, and/or use of video; and is delivered around the time of hospital discharge. A shift towards providing education during the home recovery period has recently been implemented (Fredericks & Sidani, 2012), in which the education is delivered over the telephone. Results have demonstrated positive effects of using this medium to deliver patient education as it has reduced anxiety during the home recovery period. However non-significant results have been reported in terms of knowledge acquisition, performance of self-care behaviours, and symptom management during the first 3 weeks of recovery (Fredericks, Sidani, Shugurensky, 2008). As well, approximately 25% patients reported not receiving the telephone based education, as they may have missed the phone call or may not have been well enough to engage in a conversation (Fredericks, Sidani, Shugurensky).

Purpose of discussion

A compliment to delivering educational interventions by telephone is using the internet to supplement self-care teaching during the home discharge period. In this manner, patients can access the internet at their leisure during their post-hospital discharge period. Following the use of the internet, if the individual has any additional or unanswered questions, they can engage in a telephone conversation with a nurse. Using an internet based intervention combined with a telephone follow up will maximize the number of patients who receive education. The remainder of this paper will describe a patient education intervention that is delivered through the internet, as well as by telephone, and which can be implemented as part of a continuum of care that is provided to patients following heart surgery during their post-hospital discharge recovery. In particular, the content and process for how this intervention can be delivered will be discussed.

Internet based interventions

Webb et al. (2010) examined the effectiveness of internet based interventions and reported those that incorporated a theory ($p = .049$); used behaviour change techniques ($p < .001$); and additional methods of communicating with participants, such as telephone follow-up, tended to have a substantial effect on behaviour change. Use of an internet based intervention combined with a telephone follow-up component, allows for the provision of post-operative recovery information, which can be readily accessed and individualized by patients at any point in time. Following the completion of internet based interventions; Webb et al. (2010) and Cote et al. (2011) noted that patients had fewer questions and shorter interaction times with their health care professional, than that of a follow-up phone call. Thus, combining the internet and telephone to deliver educational interventions may serve to reduce nursing workload, allow patients to access information at their convenience, provides unprecedented access to information, and significantly improves health outcomes resulting in fewer hospital readmissions and complications (Cote et al., 2011).

Description of the internet-telephone based intervention

The internet component of the education consists of the design of a webpage in which patients will be asked to complete a patient learning needs questionnaire prior to receiving the education. Patient Learning Needs Scale (PLNS) (Jickling & Graydon, 1997) will be used to identify patient's perceived learning needs during their post-hospital recovery. This is a self-report measure with a 6 point Likert scale, where responses range from 0 - not important to learn, to 5 - extremely important to learn. Topic areas on the PLNS include: complications (specifically, how to recognize complications and which complication to give priority for treatment), activities (in particular, what are appropriate physical activities that should or can be performed during post-operative recovery), medication (particularly what are different strategies for medication management), symptom (related to incision and chest pain, nausea, vomiting, fatigue, sleep disturbance, constipation, and edema/water retention) management and control (mainly, what are common symptoms and strategies to manage symptoms), emotional reactions (specifically, why do I feel this way?), and incision care (in particular, how to care for chest wound).

Using the PLNS to guide the topics for discussion will focus the education that is being delivered, enhance the likelihood for retention and application of information, and allow for the efficient use of patients' time. Following the completion of the PLNS, topics that patients identified as either very important (rated a 4) or extremely important (rated a 5) to learn about will appear on the screen. Patients can click on the various topics to obtain more information relating to self-care. Patients will be able to access this self-care education via the internet, at any point in time following their hospital discharge.

The telephone component of the education will consist of one telephone call, which will be made by a trained nurse, during the first week following hospital discharge. During this call, the nurse will answer any questions that the patient may have, and/or will provide them with new information. At the time of the telephone phone call, the patient may or may not have accessed the internet component of the educational intervention. If they have accessed the internet component of the intervention, the nurse can review any materials that the patient may have reviewed or present new information based on the individual's perceived learning needs. If the nurse is not able to speak directly with the patient at the time of the telephone phone call, the individual will still be able to access the internet component of the education.

Considerations for the design of an internet-telephone intervention

Age

Having a combined internet-telephone based intervention will allow patients to have access to education during the post-operative post-hospital discharge period. Within the cardiovascular surgical population, the design of an internet-telephone educational intervention will need to be tailored to the older adult, as the majority of patients who undergo cardiovascular surgery, in particular coronary artery bypass graft surgery and

valve replacement procedures tend to be over the age of 65 (XXX, 2012). Findings suggested a portion of individuals aged 60-74 viewed the internet as being cold, impersonal, indirect, and difficult to navigate (Melenhorst & Bouwhuis, 2004). Having an education intervention tailored to reflect patient learning needs is one way in which to personalize the use of the internet. Also, having the opportunity to interact with a nurse during the home recovery period, can serve to assist with any difficulties individuals may have encountered when navigating through the online education program.

Furthermore, the internet portion of the educational intervention will adhere to the principles outlined by the National Institute of Aging (2012) for the design of websites for seniors. Thus, the websites will be designed with information broken into short sections, the language will be clear, each major section will be numbered, and use of jargon and medical language will be minimized to promote retention and avoid confusion. To allow for ease of interaction with the webpage there will be no more than a single mouse click to access content; and additional spaces around the clickable targets. The content will be easily visible and presented in either a 12 or 14 inch font. An enlarge text button will be built into the webpage, and high-contrast colours will be used in combination with black type against white background to further promote ease of use and interaction with webpage. There will be minimal scrolling and a speech function in which the text can be read aloud will be added.

Moreover, the webpage will be designed in such a manner that it will be easy to determine the type of information that is being described and how it is organized. This will allow the individual to clearly discern the starting point of the educational interaction and be able to predict what type of information a link will lead them to; as well as where they can find more information; and/or how to return to a previously visited page.

The structure of the website will be simple and straightforward to reduce any complexity. As well, similar topics will be grouped together so that visually, it will be easier for individuals follow. For example, information related to walking, climbing stairs, performance of usual activity, lifting or pulling weights, and sexual activity will be grouped under the main heading of activity performance. Clear headings will be used to direct individuals to desired content without the presence of ambiguity.

Socio-economic status

In addition to age, an individual's socio-economic status will need to be taken into account prior to the implementation of an internet-telephone intervention. In 2010, 46 % of low income Canadian households, that is incomes of $30,000 or less, did not have access to internet at home (National Seniors Council, 2011). Individuals aged 65 years and older, represent 21.3 % of seniors living in low income households. As the majority of individuals who undergo CVS are on average 65 years of age, it is likely that a proportion of these individuals may not have ready access to the internet. If this is the situation, patients will be informed of various ways in which they can access the internet, which may include using the computers at local community centres or libraries or

speaking with their cable provider to see if they qualify for a low-cost broadband plan which may average $ 9.95/month (The Mark, 2012).

In summary, an internet-telephone educational intervention was presented in this paper as an alternative to usual CVS post-discharge patient education. It was reasoned that a combined internet-telephone intervention would decrease nursing workload, provide patients with increase access to information, and reduce the number of hospital readmissions and complications experienced during the post-hospital recovery period. A discussion of the intervention was provided in which both components (internet and telephone) of the intervention would be individualized to reflect the learning needs of the individual. Finally, a presentation of the various considerations that will need to be made in relation to the design of the intervention, as it relates to age and socio-economic status was provided.

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