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The Use of iPad Tablets and Online Videos for Oncology Patient Education to Increase Patient Knowledge and Satisfaction

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Abstract

Purpose/Objectives: To provide an overview of the efficacy of using iPad tablets and online education videos to provide cancer related patient education to increase patient knowledge and satisfaction.

Data Sources: A literature search for peer-reviewed articles from 2009-2019. Databases searched include Cochrane, CINAHL, and PubMed. English language terms utilized: *waiting, patient experience, patient satisfaction, cancer, positive distraction, oncology, music, patient education, iPad, television, and online education.* 10 articles will be utilized for this review.

Conclusions: Patient education videos by way of iPads are more effective in increasing patient knowledge and patient satisfaction when compared to the standard pamphlet or written patient education methods. Patients who viewed online education videos as an educational tool scored significantly higher on the post-study questionnaires than patients who were given standard education pamphlets.

Implications for Nursing Practice: Nurse Practitioners working in the ambulatory setting face challenges in adequately educating patients in brief office encounters. Online patient education videos can give patients the option to continue learning about his/her disease and treatment plan from home with no time constraint. Using iPads during a clinic appointment for patient education establishes individual-level learning priorities to develop and carry out education plans. Nurse Practitioners and other providers are uniquely positioned to support the use of technology to provide educational materials during wait times and to evaluate the patient's level of comprehension following each educational intervention.

Introduction

Over the past 10 years, adult use of the internet has grown (Pew Research Center, 2013). Research has shown that more and more patients are relying on the internet to gather information about their health (Atack & Luke, 2012; Pew Research Center, 2013). In the article *Cancer 2.0*, a survey conducted by Pew Research Center found that 35-59% of U.S. adults used the internet to look up health information to assist with self-diagnosing a medical condition (Pew Research Center, 2013). Oncology patients fall right in line with this survey's results as they also are turning to the internet as a reliable source of gathering information about cancer and its treatment (Huang & Penson, 2009). Technology has advanced tremendously over the past 20 years including the development of Internet video programming along with handheld/lap devices such as mobile phones, iPad's, and laptops. Considering this, Internet video programming has become a mobile concept, now essentially accessed anywhere, including clinic exam rooms. While there are time constraint barriers which can prevent health care providers from spending ample time with patients and offering detailed diagnostic and treatment teaching during a clinic appointment, patients can search for information about their diagnosis and treatment options on the internet from home with no time constraint (Pew Research Center, 2013).

It is well documented that informational needs of oncology patients are relatively high due to the complexity of cancer and cancer treatments (Turner et al., 2005; Atack & Luke, 2012). This population of patients need easy and reliable access to accurate clinical information and resources to help them cope with all aspects of their disease. To date, written pamphlets are the standard tool used for delivering patient education to oncology patients. However, according to a survey in the article *Health Online 2013*, patients prefer to use both information received from the internet and information received from their clinician to assist with their learning (Pew

Research Center, 2013). Patients' high usage of the internet to find medical information leads one to ask if providers should be using technology more to meet the educational needs of their patients. Online videos as an educational tool could help meet the educational needs by offering patients easy access to online educational information from home. These videos can be viewed when the patient is ready to view them, paused, rewound, and viewed multiple times. With the rise of information and mobile technology in medicine, adding patient education videos to iPads can be a potential standard practice.

Significance of patient education

Patient education is a fundamental component of enhancing medical self-care. The importance of patient education is based on the basic argument that an educated and knowledgeable patient has the capability to actively participate in his or her own cancer treatment. According to Vawdrey et al. (2011), the key objective of patient education is aimed at increasing the levels of participation and comprehension of cancer patients towards the self-management of medical care requirements to improve their quality of well-being. Ventola (2014) asserted that patient education should be a well-developed methodical process which is individualized and capable of assessing and evaluating information before it is relayed to patients and their families to improve their overall health condition. Health literacy contributes to this argument in that poor health outcomes increase with lower levels of health literacy (Hoover et, al., 2008; Mantwill & Schulz, 2017; Tsai et al., 2018). Health literacy has been defined as having a "limited capacity to obtain, process, and comprehend basic health information needed to make appropriate health care decisions" (Ratzan and Parker, 2000 as cited in Kindig et al., 2004). Interventions for addressing health literacy includes simplifying health information in education materials which can include visuals such as iPad tablets with video education, and interactive

self-health tools (Sudore & Schillinger, 2009). Hibbard and Greene (2013) demonstrated that cancer patients who are actively involved in their treatment process have a higher probability of cooperating and understanding their diagnoses. Ultimately, a health literate patient can contribute to his or her treatment and overall well-being by identifying and reporting worsening symptoms or treatment side effects at early stages. Additionally, patient safety is increased, anxiety levels can be decreased, and the level of satisfaction can appreciably be enhanced the more health literate patients are (Koay, Schofield, & Jefford, 2012).

Effectiveness of Patient Education via iPads

The last four decades have been characterized by knowledge acquisition driven by technology (Zawacki-Richter & Latchem, 2018). The rapid growth in various modes of technology has led to the discovery of different ways of learning. In particular, the field of nursing has greatly benefited from the new discoveries. As such, newer and better methods of patient care are on the rise. The use of information technology in nursing is already being attributed to significant benefits in regard to patient education and information (Devaraj et al., 2013; Rouleau et al., 2017). The empirical knowledge on the use of technology, and hence its effectiveness in nursing, is founded on research based on evidence. Studies have been conducted by several scholars to investigate the use of different forms of technology such as iPads tablets in patient education (Wischer et al., 2018; Moshtaghi et al., 2017; Morgan et al., 2015; Clifton et al., 2018; Richards et al., 2018; and Nogueira et al., 2013). In this review, the effectiveness of oncology patient education through the use of iPads, tablets and online videos are demonstrated in two main study outcomes – knowledge increase and patient satisfaction (Table 1 in Appendix A).

Knowledge Increase

Among all studies included in this review, knowledge was assessed in more than half of the studies (n=10) via administration of a pre- and post-test when watching an online video via iPad or using iBooks via iPad. Wischer et al. (2018) focused on patients with cardiac disease who received percutaneous coronary intervention prior to hospital discharge. The researchers set out to examine the possible outcomes of applying video education as a supplementary technique to the conventional education that is accorded to patients upon discharge. On examining the results, a paired t-test showed an improvement in patient knowledge from a pretest mean of 88.97 to a posttest mean of 96.62. This study showed that participants had an increase in percutaneous coronary disease knowledge and satisfaction with the method of education received after viewing the online video education via iPad. Morgan et al. (2015), also used tablet technology with iPads to enhance the education levels of newly diagnosed stage I-III breast cancer patients. Out of the 25 patients who participated in this study, knowledge retention expanded with 88% of the patients answering all 5 question correctly on the post-knowledge test.

Armstrong, Idriss, and Kim (2011) conducted a randomized control trial to compare the effectiveness of online education videos versus standard pamphlets for adult patients in the use of sunscreen. The investigators found with the post-test that the online video group demonstrated considerable improvement in their sunscreen knowledge over the pamphlet group. Bol et al. (2012) compared cancer-related information given to lung cancer patients in either online text only, online text with non-personalized video, and online text with personalized video. Similar to Armstrong et al. (2009), Bol and her fellow colleagues (2012) found that the online information in text only format group had much lower scores (33% recall) than the other groups (67% recall). Similarly Karunagaran, Babu, Simon, Sukumaran, and Antonisamy (2016) assessed the

effectiveness of a video assisted teaching tool compared with standard teaching on decreasing anxiety to increase the knowledge base of patients preparing to undergo gastroscopy procedures. A pre and post questionnaire was given to assess patients' anxiety levels using the *State Trait Anxiety Inventory*, and a questionnaire was given to assess patient knowledge of gastroscopy. Post test results revealed that the video assisted teaching group had a significant increase in mean scores related to knowledge (i.e. from 4.55 to 12.38) and their anxiety level mean scores decreased from 43.83 to 35.75 . The researchers concluded that teaching patients as they prepare to undergo a gastroscopy procedure via the video education method, greatly increased patient knowledge and anxiety.

Video use and American Sign Language. Choe et al. (2009) which focused on cervical cancer education for deaf adult women. The purpose of this study was to investigate whether a cervical cancer education video in American Sign Language (ASL) was culturally and linguistically the most appropriate method of increasing cervical cancer knowledge amongst deaf women when compared to *The Basics* (a National Cancer Institute's clinical trials PowerPoint ASL education program) (Choe et al., 2009). The researchers found that the participants in the experimental arm who viewed an ASL cervical education video in general had higher scores on the posttest survey regarding cervical cancer (pre-test score 74%, posttest score 87%, and 2 months posttest score 80%) than the control group (pre-test score 73%, posttest score 74%, and 2 months posttest score 73.8%) (Choe et al., 2009). These results indicate that the experimental group gained and retained more cancer related knowledge than their counterparts.

Shabaik et al. (2010) provides further data supporting the effectiveness of an ASL patient education video for the deaf community. Shabaik et al. investigated the use of an ASL colorectal cancer (CRC) education video to increase understanding and knowledge of patients in the deaf

community when compared to *The Basics.* The results indicated that immediately post-intervention the ASL CRC video intervention experimental group had higher scores related to both general cancer knowledge and CRC ($p \leq 0.05$). These results suggest that an ASL oncology related education video based intervention is an effective patient education tool for the deaf community.

iBooks for patient education. Moshtaghi et al. (2017), sought to assess and evaluate the use of interactive iBooks for patient education in otology. A total of 66 patients with chief complaints of tinnitus, dizziness, hearing loss, or cochlear implants were included in this study. The results of the study demonstrated perception of knowledge improvement for the 44 patients who were given iBooks (27% increase) than the 22 patients who did not (13% increase). In addition, they demonstrated a more compact understanding of their hearing conditions. The outcomes indicated that the introduction of the iBooks could directly be attributed to the positive knowledge gains. The use of the iBooks demonstrated the potential of personalizing information in a form that was easier to comprehend for the ontology patients. A similar account could be replicated for cancer patients by including fundamental information on cancer treatment such as chemotherapy and radiotherapy in the iBooks.

Patient Satisfaction

According to Gallant et al. (2011), patient satisfaction describes the extent to which patients are generally happy with the medical care that is given to them. The extent of this happiness is defined both within and without the doctor's office and includes care that is patient centered. In the report, *Crossing the quality chasm: a new health system for the 21st century* issued in 2001, the Institute of Medicine (IOM) defines patient-centeredness as "providing care that is respectful of and representative to individual patient preferences, needs, and value and

ensuring that patient values guide all clinical decisions" (National Academy Press, 2000). Dimensions of these values include: treating the patient as an individual, listening to the patient's concerns, engaging in partnerships with patients, showing patience, compassion, and respect, and communicating the expectations for treatment clearly (Cheraghi-Sohi et al., 2006; Moore, Hamilton, Krusel, Moore, &Pierre-Louis, 2016).

A measure of customer satisfaction is also important to health care organizations as well as ensuring that the well-being of the patients is taken into account. Farzianpour, Byravan, and Amirian (2015) conducted a literature review on patient satisfaction and factors affecting it. The following dimensions were found to be statistically significant: quality of service, education level of physicians and nurses, and provision of treatment related information (Farzianpour et al., 2015). In the case of cancer patients, this level of satisfaction is uniquely important. The treatment of cancer is characterized by lengthy and complex treatment techniques that are done over extended periods of time. As a result, the level of satisfaction obtained by cancer patients is strongly dependent on a varied number of factors including the methods that are used in aiding the treatment. Much research has been carried out on the role of technology, such as the use of iPads, in patient satisfaction (Atack & Luke, 2012; Bol et al., 2017; Clifton et al., 2018; Dallimore et al., 2017).

Bowers et al. (2017) conducted a study on the use of multimedia presentation in increasing the understanding and satisfaction levels of vascular patients. A randomized controlled method was used to conduct the study by separating two groups into a control and experimental arm. Using Apple iPads, the experimental group watched a two-minute video on vascular procedures, whereas the control group were subjected to the conventional verbal education. All 80 participants of the study were then asked to complete a questionnaire on their

satisfaction levels as well as assessing the comprehension levels of the vascular procedures. The intervention was shown to have increased both the comprehension levels of the vascular procedures and their level of satisfaction with the education method. Similar studies on the role of iPads in enhancing the satisfaction levels of patients have been carried out by Dallimore et al. (2017) and Wischer et al. (2018). Both studies concluded that the use of iPads had significant contributions in the satisfaction of the patients. In comparison to paper booklets, Dallimore et al. (2017), concluded that the use of iPads improved the efficiency of treatment as well as the process of information retrieval.

Armstrong et al. (2011), Bol et al. (2013), and Wischer et al. (2018) had an additional purpose of examining patient satisfaction with educational content. Bol et al. (2013) found patient satisfaction with use of the education content displayed on the website to be correlated with the ability to recall information given. In their study the Website Satisfaction Scale (WSS) was used as the tool to measure 3 levels of satisfaction: 1) satisfaction with the comprehensibility of the website, 2) satisfaction with the attractiveness of the website, and 3) satisfaction with the emotional support of the website (Bol et al., 2013). For the post-test given to the participants, they used the 7-point Likert response scale in which scores ranged from 1 ‘totally disagree’ to 7 ‘totally agree’ to measure satisfaction (Bol et al., 2013). Across the board both the text with non-personalized video and text with personalized video groups had higher levels of satisfaction. Similarly, Armstrong et al. (2011) discovered that nearly 91% of the video group were satisfied with it as a tool in their education. Lastly, Wischer et al. (2018) found that 98.1% of study participants were extremely satisfied with the video education received and additionally were more confident in their abilities to provide post-procedural heart care upon hospital discharge.

Conclusion

The importance of oncology patient education is critical because educated and knowledgeable patients have the capability to actively participate in their own treatment, have an understanding of what to expect with treatment, and adhere to treatment plans. This review focused on evaluating knowledge and patient satisfaction from online patient education videos, patient education videos via iPads, and patient education via iBooks. Overall, all of the studies reviewed had an outcome of patient increased knowledge and half of these studies also indicated there was an increase in patient satisfaction from the use of the above education method. These results demonstrate that all the above can be useful tools in promoting patient education.

Implications for Nursing Practice

Time constraints can prevent health care providers from spending ample time with patients and offering them detailed education regarding treatments during a clinic appointment. Online patient education videos can give patients the option to continue learning about his or her disease and treatment plan from home with no time constraint. Adding chemotherapy education to iPads as a tool to teach patients about their treatment can help assess individual-level learning needs during the appointment, and help to develop an individualized education plan for the patient. Due to the advancements in technology, and as the internet user base continues to grow, health care providers should consider using educational videos via iPads as a way to deliver education to patients. The Nurse Practitioner can play an effective role in improving patient education. As a provider, the Nurse Practitioner has an unique position and is in an ideal stance to evaluate the patient's level of comprehension following each educational intervention. However, other members of the healthcare team, such as a registered nurse or physician, can also be taught how to use the iPad for online video patient education teaching. Effective patient

education plays a crucial part in patient knowledge and satisfaction. The literature presented suggests that the patient learning experience can be improved by using online educational videos to help satisfy the educational needs of oncology patients. Hospital administrators should explore the possibility of including online patient education videos via iPads in the hospital budget for patient care.

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Appendix A

Table 1: Summary of study characteristics

Summary of study characteristics (n=10)				
Study	**Patient Type**	**Study design**	**Intervention**	**Study outcome**
Armstrong et al. (2011)	Skin cancer prevention- general	Randomized control trial	Online education video	Knowledge/patient satisfaction
Bol et al. (2013)	Lung cancer patients	Randomized control trial	Online education video	Knowledge/patient satisfaction
Bowers et al. (2017)	Patients receiving vascular procedure	Randomized control trial	Education video via iPad	Knowledge/patient satisfaction
Choe et al. (2009)	Cervical cancer prevention	Randomized control trial	Education video	Knowledge
Dallimore et al. (2017)	Post op hip surgery patients	Randomized control trial	Education video via iPad	Knowledge/patient satisfaction
Karunagaran et al. (201	Pre-gastroscopy patients	Ranomized control trial	Education video	Knowledge
Morgan et al. (2015)	Breast cancer patients	Pilot study	Education video via iPad	Knowledge
Moshtaghi et al. (2017)	Otology patients	Randomized control trial	Education via iBooks/iPad	Knowledge
Shabaik et al. (2010)	Colorectal cancer patients	Randomized control trial	Education video	Knowledge
Wischer et al. (2018)	Cardiac rehab patients	Randomized control trial	Education video via iPad	Knowledge/patient satisfaction