J Canc Educ (2010) 25:445–450
DOI 10.1007/s13187-010-0072-3

Use of Technology for Educating Melanoma Patients

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Published online: 25 March 2010

Abstract We evaluated the feasibility of using technology for melanoma patient education in a clinic setting. We assessed technology skill level and preferences for education. Data were collected using an adapted version of the Use of Technology Survey. Most participants owned a computer and DVD player and were skilled in the use of these devices, along with Internet and e-mail. Participants preferred the option of using in-clinic and at-home technology versus in-clinic only use. Computer and DVD applications were preferred because they were familiar and convenient. Using technology for patient education intervention is a viable option; however, patients' skill level and preferences for technology should be considered.

Keywords Educational technology · Patient education · Melanoma

This study was presented at the University of Arizona College of Nursing 50th Anniversary Research Conference, Tucson, AZ, January 2008.

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Introduction

Melanoma is the sixth most common cancer in the United States [1]; however, there are at least 588,000 melanoma survivors [2]. For these individuals, the incidence of a second primary melanoma ranges from 0.5% to 5.5% or 10 to 25 times greater than the risk for someone without a history of melanoma [3]. Skin examination is efficacious for detecting melanoma occurrence or recurrence early [4], and sun-protective behaviors reduce risk [5]. There are few studies of approaches to educating melanoma patients about these critical behaviors and the formats and technologies used to present such information.

Public education approaches to skin cancer have focused on the use of newer technologies, such as the Internet, to enhance learning. For example, in Bernhardt's study, skin cancer information provided on a tailored Web page was perceived by participants as being more personalized than a nontailored Web page, but the tailored page did not significantly affect their sunscreen application [6]. However, findings from another study of 74 melanoma Web sites indicated that a majority of these sites failed to include complete basic information on melanoma, 14% contained inaccuracies, and none used innovative visual aids such as videos [7].

Fewer studies have targeted skin cancer education for melanoma high-risk groups. Sefton and colleagues found that both interactive and noninteractive computer interventions increased short-term skin cancer knowledge; however, knowledge scores increased even more with an interactive computer intervention plus booster information [8]. In another study, patients with atypical moles were more likely to do skin self-examination regularly after receiving an hour-long in-person teaching intervention that included a personal digital photo book of their moles [9].

A pattern evident in these studies is that personalized interventions, regardless of the type of technology used, fared well with patients. Nevertheless, insufficient replication of reported interventions contributes to difficulty in drawing conclusions about their efficacy, particularly in melanoma high-risk patients. Importantly, there are few reports on melanoma education using technologies such as the Internet, and no reports on newer devices such as iPod/MP3 players. Before implementing such tools in a clinic setting, we needed to learn more about the types of technologies that patients would be receptive to using for educational interventions.

This study examined the feasibility of using specific technology for patient education in a clinic setting. Specific aims were to assess (1) characteristics of technology use (types, skill level, weekly usage), (2) types of technology patients prefer for education, and (3) reasons for preferences.

Materials and Methods

Design

This cross-sectional descriptive study was part of a larger parent study of melanoma patients and their family members. One aim of the parent study was to examine provider melanoma risk communications; the substudy reported here expands on that aim.

Sample and Setting

The convenience sample consisted of men and women who were at least 18 years of age, had a diagnosis of melanoma, and were able to read, write, and understand English. Potential participants had to be enrolled in the parent study and provided permission to be recontacted for involvement in supplemental research. They also had to be patients in the Cutaneous Oncology Program (COP) at the Arizona Cancer Center which is dedicated to the diagnosis and treatment of patients with cutaneous malignancies. After being seen by their physician during a typical visit at the COP, patients have a 15- to 30-min session with the health educator who conducts a brief assessment of learning style, then presents information on sun protection and skin examination in a format compatible with that style.

Measurement

We defined technology as electronic media that includes computers (desktop, laptop, tablet PC), DVD players, VHS players, Internet, smart phone (cell phone with PDA, camera, and/or Internet), and iPods/MP3 players and peripherals such as printers, scanners, flash drives, and DVD/CD drives.

Data were collected using an adapted version of the Use of Technology Survey (UTS) developed by The University of Arizona Eller College of Management to assess college students' technology preferences. The 10-item adapted survey addresses general types of technology owned by patients, perceived skill level, specific technology applications that could be options to use, typical weekly use, preferred type of technology to use in the clinic setting, and reasons for preferences. The skill level items were scored on a five-point Likert-type scale with responses ranging from "do not use" to "very skilled." There is also a response option of "What's this?" for participants who were unfamiliar with the technology. For the items regarding typical weekly use, the six choices range from "do not use" to "11 or more hours." For each item set, participants were asked to check either one response or all responses that apply or to provide a brief descriptive answer. Additional items asked about age group, gender, and educational level.

Procedures

The study procedures were approved by The University of Arizona Human Subjects Protection Program. Ninety-three patients enrolled in the parent study had agreed to be recontacted for additional research. The principal investigator (PI) mailed the UTS, which included the consent disclaimer, to these individuals, along with a prestamped return envelope and instructions to return the survey within 2 weeks. Persons not returning the survey were mailed a postcard reminder, and 2 weeks after that received one phone call from the PI. Patients were recruited from May to October 2007.

Data were analyzed using SPSS, version 17.0 (SPSS, Inc., Chicago, IL). The research team categorized responses to the open-ended questions (reasons for patient's technology preferences).

Results

Characteristics of the Sample

Fifty-five surveys were completed and returned (59% response rate) by 29 (51.9%) women and 26 (48.1%) men. Thirty-two (58.2%) were 56 years or older, and equal numbers had at least a bachelors degree.

Characteristics of Technology Use

The highest percentages (85%) owned a cell phone, DVD player, or printer. Over 90% of the sample owned one or more computers (desktop, laptop, and/or tablet PC). Of all participants, 86% reported having some type of Internet connection

Table 1 Frequency (in percent) of perceived skill level for selected technology devices and applications (listed alphabetically)

Device or application	Not familiar	Do not use	Very unskilled	Unskilled	Skilled	Very skilled
Device						
Computer (n=54)	0	0	3 (5.5)	9 (16.7)	34 (63.0)	8 (14.8)
DVD Player (n=52)	0	3 (5.8)	3 (5.8)	6 (11.5)	30 (57.7)	10 (19.2)
iPOD/MP3 player (n=44)	0	20 (45.5)	2 (4.5)	6 (13.6)	15 (34.1)	1 (2.3)
VHS Player (n=49)	0	6 (12.2)	3 (6.1)	4 (8.2)	27 (55.1)	9 (18.4)
Plug-ins (n=46)	3 (6.5)	12 (26.1)	4 (8.7)	7 (15.2)	18 (39.1)	2 (4.3)
Application						
E-mail (n=54)	0	4 (7.4)	1(1.9)	4 (7.4)	24 (44.4)	21 (38.9)
Instant messaging (n=52)	1 (1.9)	14 (26.9)	5 (9.6)	9 (17.3)	17 (32.7)	6 (11.5)
Pdf (n=52)	7 (13.5)	13 (25.0)	3 (5.8)	7 (13.5)	15 (28.8)	7 (13.5)
Podcasting (n=49)	4 (7.8)	30 (58.8)	5 (9.8)	10 (19.6)	1 (2.0)	1 (2.0)
Powerpoint (n=52)	1 (1.9)	20 (38.5)	3 (5.8)	10 (19.2)	13 (25.0)	5 (9.6)
Web surfing (n=53)	0	3 (5.7)	4 (7.5)	7 (13.2)	25 (47.2)	14 (26.4)
Word attachment (n=50)	2 (4.0)	8 (16.0)	2 (4.0)	6 (12.0)	20 (40.0)	12 (24.0)

at home, the majority of which was commercial broadband service (51%); however, 15% did not use the Internet.

Table 1 shows perceived skill level with technology devices and their applications that could have some utility in patient education. About 75% of participants were skilled to very skilled in usage of all devices except for plug-ins and iPods/MP3 players. Over half were skilled to very skilled in Web surfing, e-mail, and using Word attachments. Podcasting was the only application that a majority of participants (58.8%) did not use.

Table 2 presents weekly usage of technology applications. Over 69% of participants reported spending three or more hours using e-mail and 55% reported spending three or more hours per week getting information using technology devices and applications. All but seven (14%) spent time each week surfing the Internet for fun. Participants reported that they did *not* use technology applications such as podcasting (91.8%), playing games (52.9%), or reading books (51%).

Preferred Types of Technology for Patient Education

When asked what technology they preferred for in-clinic only education, only five (9.6%) participants preferred computer-based programs, eight (14.5%) preferred a DVD player, and three (5.5%) preferred an iPod/MP3 player. Participants strongly preferred technology for educational purposes that could be used both in the clinic and the home, specifically computer-based programs (73%) and DVDs (80.8%). Participants did *not* prefer any use of IPod/MP3 players (82.7%) for in-clinic or at-home use.

Reasons for Technology Preferences

Forty-six (55.9%) of participants answered the open-ended question on reasons for in-clinic and at-home technology preferences. General categories of responses included familiarity (e.g., "it's the only device I know how to operate"), ease of use (primarily for computer and DVD applications),

Table 2 Hours (in percent) weekly use of selected technology applications (listed in ascending order of frequency of nonuse)

Use	Do not use	<1h	1–2h	3–5h	6–10h	11+h
Get information (n=49)	3 (6.1)	9 (18.4)	10 (20.4)	16 (32.7)	5 (10.2)	6 (12.2)
E-mail (n=53)	5 (9.4)	0	11 (20.8)	18 (34.0)	12 (22.6)	7 (13.2)
Surf Internet for fun (n=50)	7 (14.0)	10 (20.0)	15 (30.0)	11 (22.0)	6 (12.0)	1 (2.0)
Listen to music on devices (n=49)	14 (28.6)	9 (18.4)	14 (28.6)	8 (16.3)	4 (8.2)	0
Shop online (n=50)	15 (30.0)	22 (44.0)	9 (18.0)	1 (2.0)	3 (6.0)	0
Watch movies (n=50)	19 (38.0)	8 (16.0)	9 (18.0)	12 (24.0)	1 (2.0)	1 (2.0)
Read/listen to books (n=51)	26 (51.0)	4 (7.8)	7 (13.7)	11 (21.6)	1 (2.0)	2 (3.9)
Play games (n=51)	27 (52.9)	8 (15.7)	7 (13.7)	7 (13.7)	2 (3.9)	0
Listen to/view podcasts (n=49)	45 (91.8)	4 (8.2)	0	0	0	0

flexibility (can take as much time as desired to get the information), convenience/accessibility (e.g., what they have at home, can use it at home or in the clinic, can listen to while driving), and visual and auditory learning (DVD). Other reasons that did not correspond directly to the type of technology included "to better inform myself," "get up-to-date information about skin cancer," and "seek knowledge." One participant stated:

> I use them (computer, DVD player, iPod) already in other parts of my life, so it would be natural to incorporate this as a choice for both home and the clinic. While you are waiting in clinic you could be learning about melanoma.

Thirty-eight (69%) participants provided reasons for *not* preferring a type of technology for in-clinic or at-home use. These reasons generally reflected use of an iPod/MP3 player and were the following: inconvenience, lack of ownership, and did not know how to use it (and "don't want to learn"). One participant commented that the video iPod screen was too small. In terms of computer use, some participants thought the option to have education at home would be more comforting because they were not skilled and "prefer to have quiet, alone time to view this information." Finally, participants reminded us that, "I'm not in clinic that often, so I need something for use at home."

Discussion

Educating melanoma patients about prevention and early detection is critical given their higher risk of developing another melanoma or recurrent disease. The methods for accomplishing this education are not well elucidated; however, using newer technology may be one such approach. Findings from this study provide preliminary information regarding the types of technology used and preferred by melanoma patients, along with technology that may be feasible for patient education in a clinic setting.

The age range of the sample (56 years or older) reflected the typical age of persons diagnosed with melanoma [1]. The sample was well educated; however, we did not ask participants about their strategies for learning about technology they were familiar with. Computer-based applications may be optimal for educating melanoma patients. Over 70% of participants reported being skilled or very skilled with using the computer and applications such as the Internet and e-mail. Approximately 73% of Americans have Internet access, about 60% go online daily, and over 60% use e-mail each day [10]. Only 14% and 9.4% of our sample reported *no* weekly use of the Internet for Web surfing and e-mail, respectively.

The Pew Project reported that eight out of 10 Internet users seek health information comprised of print or visual media [11]. Over 50% of online adults have used the Internet to watch or download video [12]; video also can be successfully delivered using DVD players owned by 83% of our sample. Video instruction has been shown to significantly increase satisfaction with delivery of health information [13, 14], health knowledge [14, 15], reduce patient anxiety, and improve self-care practices [16]. In a comparison study of video versus Internet education about prostate cancer screening tests, persons viewing a video had higher knowledge levels [17]. Although we did not specifically ask participants about their viewing of health information videos, 62% used technology devices to watch movies.

Adults like to draw from their existing knowledge and previous experiences [18], and this is reflected in the participants' preferences for technology that they knew how to use. Furthermore, adults tend to be practical, preferring devices that they have access to at home. Adults have a propensity to be independent and self-directed, preferring to have input and control over their own learning [18]. Most participants in this study had definite opinions about technology they preferred to use. They overwhelmingly preferred the option of in-clinic or at-home use over in-clinic use only. By allowing individuals to choose their preferences for technology and locations, they have greater control of their learning. Although the majority of the sample was over age 55 years, the only issue related to age (e.g., visual or hearing impairments, compromised fine motor movements, etc.) was the one comment that the iPod/MP3 player video screen was too small.

Considering these findings, assessing the technology preferences of a specific population is optimal before designing a technology-based patient education intervention. For example, based on our results, for patients over age 55 years, we would use a video delivered education intervention using DVD technology or computer-based technology, such as the Internet or e-mail. We likely would not incorporate PowerPoint or podcasting into our interventions, but would consider using Word or .pdf attachments as part of an e-mail intervention. In contrast, younger patients might prefer interventions using MP3 or instant messaging technology. Designing interventions in the form of games also might be applicable to a younger age group, but not to the persons in our sample.

Strengths and Limitations

The format of the UTS presented a few challenges. Some participants skipped portions of the questions pertaining to skill level and weekly usage of technologies, which we attributed to the use of alternating shaded and unshaded rows for displaying each item/application. On the question

about technology skill level, some participants skipped devices for which others responded "not highly skilled" in using (e.g., iPod/MP3 player and plug-ins). Many participants skipped the open-ended questions for reasons of technology preferences. A better way to obtain that information would be to have a preference question for each device or application.

Because all of our participants previously had received comprehensive in-person education by a health educator in the COP, we did not ask them if they would prefer technology-delivered education over in-person education. In another study of one-on-one teaching with a healthcare provider, patients were more satisfied with the quality of information if they perceived adequate time for the encounter [19]. Our assumption is that, in a typical outpatient melanoma clinic, prevention and detection information is delivered by a provider (who may not have the time for comprehensive education), rather than by a dedicated health educator. In that regard, the practical and time-saving nature of technology use might outweigh personalization [6, 8, 9, 19, 20].

Participants in this study clearly preferred the option of in-clinic or at-home use of technology versus in-clinic use only. If technology-based interventions are flexible and account for individual preferences, patients might perceive them as more personalized. For example, some participants preferred the option of a DVD because they could take the DVD anywhere, start/stop/replay as they pleased, and watch the program at any time. Melanoma education could still be tailored with the combination of a brief technology intervention covering basic information followed by individualized teaching by the healthcare provider. Because most of our participants used e-mail, provision of e-mail education "boosters" could also lend to personalization of information.

Conclusions and Implications for Practice

Because patients often have clear preferences for certain types of technology, healthcare providers need to carefully assess these preferences and offer education in a manner that best suits their patients' needs. Technology-based interventions should be diverse and flexible, capitalizing on preferred learning strategies for many types of patients. Prior to designing the study, researchers should have a clear idea if their participants will be able to use the technology.

For future work based on our findings, an intervention that can be viewed as a DVD or linked to the Internet would be optimal for melanoma patients being seen in an outpatient clinic. Using this approach would enable the education to be delivered in the clinic or at home. Prior to this study, we had assumed that using an intervention delivered via an iPod/MP3 player would be more innovative and "clinic friendly." Our findings indicated that this would not be a wise choice. We also recognize that educational interventions using technology should supplement, not replace, counseling by a healthcare provider.

Acknowledgements This study was supported by a research grant from Sigma Theta Tau International, Beta Mu Chapter (NM) and NCI 1K07CA106996 (LJL).

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