



Published in final edited form as:

J Neurosci Nurs. 2013 October ; 45(5): 254–261. doi:10.1097/JNN.0b013e31829dba61.

Usage and Design Evaluation by Family Caregivers of aStroke Intervention Website

Linda L. Pierce, PhD, RN, CNS, CRRN, FAHA, FAAN and

Professor, University of Toledo College of Nursing, 3000 Arlington Avenue; Toledo, OH 43614 – Office (O), 413 Loyola Drive; Elyria, Ohio 44035 – Home (H), 419.383.5852 (O); 440.365.6422 (H); 419.383.5875 (Fax);

Victoria Steiner, PhD

Associate Professor, University of Toledo College of Medicine, 3000 Arlington Avenue; Toledo, Ohio 43614 (O), 7139 Finchley; Toledo, Ohio 43617 (H), 419.383.5647 (O); 419.843.3306 (H); 419.383.5880 (Fax);

Linda L. Pierce: l.pierce@utoledo.edu; Victoria Steiner: Victoria.steiner@utoledo.edu

Abstract

Background—Four out of 5 families are affected by stroke. Many caregivers access the Internet and gather healthcare information from web-based sources.

Design—The purpose of this descriptive evaluation was to assess the usage and design of the Caring~Web[®] site, which provides education/support for family caregivers of persons with stroke residing in home settings.

Sample and Setting—Thirty-six caregivers from two Midwest states accessed this intervention in a 1-year study. The average participant was fifty-four years of age, white, female, and the spouse of the care recipient.

Methods—In a telephone interview, four website questions were asked twice-/bi-monthly and a 33-item Survey at the conclusion of the study evaluated the website usage and design of its components. Descriptive analysis methods were used and statistics were collected on the number of visits to the website.

Results—On average, participants logged on to the website one to two hours per week, although usage declined after several months for some participants. Participants positively rated the website's appearance and usability that included finding the training to be adequate.

Conclusion—Website designers can replicate this intervention for other health conditions.

Keywords

stroke; caregivers; social support; internet; telehealth intervention

In the United States, over 6 million individuals have survived a stroke, affecting 4 out of 5 families (NSA, 2012). Consequently, there is a need for persons with stroke and their family caregivers to have access to reliable information about stroke and caregiving. More than 200 million people in this country use the Internet (Internet World Stats, 2011) and gather healthcare information from web-based sources. In a study of 1480 caregivers by the National Alliance for Caregiving, 50% of them had searched for web-based information related to caring for loved ones (NAC, 2009). In addition to measuring usage, it is also important to evaluate the design of these intervention websites (Palmer, 2002), because they will not be accessed if patients and/or caregivers do not like or cannot easily use them.

Researchers and web developers need to evaluate usability and design of websites, instead of simply examining outcomes of web-based interventions.

Design of a website includes its appearance and usability. Appearance incorporates a website's color and layout. Usability means that a website is easy to navigate and use (Net Success 2000 Plus Inc., 2011; Nielsen & Norman, 2000). Over the last decade examples of evaluation of the usage and design of web-based interventions for **patients** include: 1) nutrition and physical activity enhancement (Oenema, Tan, & Brug, 2005; Steele, Mummery, & Dwyer, 2007), 2) alcohol consumption (Linke, Brown, & Wallace, 2004) and smoking (An, et al., 2008), 3) diabetes (Gerber, Solomaon, Shaffer, Quinn, & Lipton, 2007; Glasgow, et al., 2011) and asthma management (Boyd & Archer, 2007), 4) eating disorders prevention (DeBate, et al., 2009; Zabinski, 2001), and 5) women's health education (Hill & Weinert, 2004). Examples of evaluation of the usage and design of web-based interventions for **caregivers** of patients include: 1) traumatic brain injury (Rotondi, Sinhule, & Spring, 2005), 2) mental illness in children (Scharer, 2005), 3) dementia (Chang, 2004), 4) heart failure and transplantation (Dew, et al., 2004; Evangelista, et al., 2006), and 5) stroke (Korner-Bitensky, et al., 2008; Rochette, Korner-Bitensky, Tremblay, & Kloda, 2008; Steiner, Pierce, & Herceg, 2004). The purpose of this report is to describe an evaluation that assessed the usage and design of the Caring~Web[®] site. Caring~Web is an online intervention of education and support for stroke caregiving families residing in home settings. This evaluation brings together subjective and objective data from surveys that family caregivers completed.

Review of Selected Literature

Usage and Design

Some researchers have used total visits to a website (Chang, 2004; Gerber, et al., 2007; Glasgow, et al., 2011; Linke, et al., 2004; Rotondi, et al., 2005; Scharer, 2005), as well as visits to each section or component of the site (An, et al., 2008; Chang, 2004; Glasgow, 2011; Rotondi, et al., 2005) as an objective measure of usability. Other objective measures included time spent on the site (Glasgow, 2011; Hill & Weinert, 2004) and number of messages posted (Dew, et al., 2004; Scharer, 2005). Time of day that the site was accessed was also analyzed by others (Gerber, et al., 2007). Subjective data collected from web user surveys have also been used to evaluate different web-based interventions. Participants in various studies have been asked to self-report their usage of a site (Chang, 2004; Dew, et al., 2004).

Users have been asked about design and their satisfaction with the sites, rating the websites in general, as well as its sections or components (Evangelista, et al., 2006; Oenema, et al., 2005). Subjective surveys have asked users to rate the appearance of the site including its layout and graphics (Linke, et al., 2004). Participants have also been asked to rate a discussion group moderator and the group's format (Zabinski, et al., 2001). Users have been asked about the ease of use (Dew, et al., 2004; Rotondi, et al., 2005), their ability to navigate the site and its sections and if they needed assistance (Evangelista, et al., 2006). Additionally, users have been asked to rate the importance or helpfulness of the sites (Evangelista, et al., 2006; Hill & Weinert, 2004; Linke, et al., 2004; Rotondi, et al., 2005; Steele, et al., 2007).

In addition to surveys, focus groups and navigational tasks have been used to evaluate usability. A prototype web-based training program for oral health care providers was evaluated for website color scheme, organization, and content through focus groups (DeBate, et al., 2009). Usability tests were also run by observing the participants complete several navigational tasks on the website (DeBate, et al., 2009). A web-based educational

program for people with asthma in rural communities was developed and evaluated through human-computer interface testing (Boyd & Archer, 2007). Participants were observed while completing a series of set tasks within the website. User interface management software and dialog about these were used to analyze the website navigability (Boyd & Archer, 2007).

Usage and Design of Stroke Websites

Various methodologies have also been used in evaluating stroke websites. Two studies on StrokEngine focused on usability, navigability, and quality of this Canadian website (Korner-Bitensky, et al., 2008; Rochette, et al., 2008). StrokEngine is an evidenced-based stroke rehabilitation intervention website designed to provide convenient access to current knowledge about stroke to researchers and clinicians (Korner-Bitensky, 2008). In the first study, nineteen rehabilitation clinicians searched a well-known stroke website, searched StrokEngine, and performed a free search as they typically would, e.g., Google, with the order of search randomized, to compare usability and navigability of the sites. A satisfaction questionnaire, developed from an extensive review of the literature that identified items important to include in website evaluation, was then administered. All clinicians gave the highest global usability score to StrokEngine. In addition, they ranked StrokEngine's navigability above or equal to the "respected websites" and higher than the free searches (Korner-Bitensky, et al., 2008).

In the second study by Rochette and associates (2008), they discussed the development of StrokEngine-Family, a website for stroke rehabilitation for laypersons that presents treatment options based on scientific information. Its usability was assessed with individuals who had experienced a stroke and their families. They looked at the homepage and reviewed two educational modules and then completed a telephone interview that asked closed-ended and open-ended questions. All seven respondents reported that they were very satisfied overall with this website. StrokEngine-Family was found to be easy to use and its content was found to be useful. Two respondents that had previous strokes felt the information would have been helpful when they had their strokes (Rochette, et al., 2008).

Steiner and associates (2004) assessed the appearance and usability of Caring~Web[®], a web-based education and support intervention for caregivers of individuals who survived a stroke, prior to its use in a randomized clinical trial (RCT) in Ohio and Michigan that examined family caregivers' experiences in caring. Steiner and associates (2004) surveyed thirty-five adult novice computer students from a community college to rate the design, content presentation, technical elements, and credibility of the Caring~Web site on a 5-point Likert scale with 1 being poor (the attribute was weakly observed) and 5 being exceptional (the attribute was strongly noted). Novice computer students were chosen because the content related to stroke and caring on the website was not evaluated at that time. Based on descriptive statistical analyses, this site was rated high overall with a mean score of 4.5 out of 5.0. The content presentation was rated highest with a mean score of 4.7 and the credibility scored lowest with a mean score of 4.2. The respondents' perceived that Caring~Web was easy to navigate and understand; however, they made a number of suggestions to improve the website. Elements added as a result of this assessment were a frequently asked questions section; joke of the day; fun activities, including word games, news, and weather; increased font size and use of color; and more topic menus and drop-down boxes (Steiner, et al., 2004).

This current website and design evaluation is a more comprehensive assessment of the Caring~Web[®] stroke intervention website and a secondary analyses of data from the RCT. Although it was not a major goal of the RCT, evaluation of the usage and design of the website provides additional information on how participants used the website. The findings from the RCT are reported in other publications (Pierce, et al., 2007; Pierce, et al., 2009).

Methods

The Intervention

Caring~Web[®] was built in collaboration with university website designers to provide support through four primary components: (a) a non-structured email discussion, Caretalk, via a mailing list that connects the caregiver with other caregivers and the nurse specialist; (b) an opportunity to email a nurse specialist backed by an interdisciplinary rehabilitation team, called Ask the Nurse, any questions or discuss issues related to caring; (c) Educational Links to information about stroke, caring, and caregivers from reputable websites; and (d) customized educational information, such as nutrition or caregiver stress, provided in a monthly educational Tip format (Steiner & Pierce, 2002). Other activities such as games, music, jokes, greeting cards as well as general and stroke-related news linked from newspapers, television stations, and Med/wire News plus weather and sports information and the Internet Public Library are available on the site (Steiner & Pierce, 2002). With approval of university and hospital Institutional Review Boards and adherence to guidelines for the ethical conduct of research, caregivers of persons with stroke were enrolled in the RCT and the web users group had access to the Caring~Web intervention for a year. Only with a username and password could these participants access the secured Caring~Web site day or night (Pierce, et al., 2007; Pierce, et al., 2009).

Sample

Adult caregivers of persons with first-time stroke living in northern Ohio and southern Michigan were recruited for the RCT following hospitalized rehabilitation treatment of their care recipients (Pierce, et al., 2007; Pierce, et al., 2009). All caregivers were able to read, write, and understand English; had a telephone; and were novice Internet users. Fifty-one caregivers were randomly assigned to the experimental group of web users (Pierce, et al., 2007; Pierce, et al., 2009). Thirty-six of the 51 web users completed the yearlong RCT

Procedures

Web users could choose to use their own computer with Internet access purchased by the investigators, or choose to use MSN WebTV[™] to connect to the Internet through their televisions. MSN WebTV[™] is easy for novice Internet users to learn and employ, and rarely gets attacked by viruses. At the time of the RCT, it was a low cost system of approximately \$100 plus a monthly service fee of about \$25.00 that was paid for web users by the investigators. A computer technician installed the MSN WebTV[™] equipment and provided training for all web users. A printer was also provided and installed, so that web users could print educational information from the website to conveniently read when they were not online. A training manual was developed by the investigators to orient the web users to the specific components of Caring~Web accessed via MSN WebTV[™] or their own computer, and how to use the printer. The computer technician was available to all web users by telephone during the day for trouble shooting technical difficulties (Pierce, et al., 2007; Pierce, et al., 2009).

As part of the RCT, both objective and subjective evaluation data focused on the Caring~Web site were gathered and examined by the investigators with descriptive analysis methods. Objective usage data on the total visits to the website were collected. Subjective data were gathered from twice- or bi-monthly questions and a final Survey, as part of a regularly scheduled telephone interview regarding the participants' experience of caring. These questions were constructed based on previous pilot data and were independently reviewed by experts in the field for content validity (Pierce, et al., 2004).

Measures—The four bi-monthly questions centered on how often participants visited the Educational Links web pages, the type of information they looked for or found, if they had technical problems, and if so, a description of the problem. These questions were added because it was thought that the participants might not remember what happened if only the Survey was asked at the end of their year of participation.

The Survey contained thirty-three questions. These questions covered visual elements of the site, ease of use, quality of the training, technical problems, and use of Caring~Web's individual components. Most of the questions used a four point scale, beginning with a score of "1" for "strongly agree" to "4" for "strongly disagree." Other questions involved time spent on the individual components during the entire study and were also on a four point scale with "1" for "less than once a week" to "2" for "once a week" to "3" for "more than once a week" to "4" for "never." Still another question focused on asking users how many hours per week they accessed Caring~Web with "1" for "less than an hour" to "2" for "1–2 hours" to "3" for "more than 2 hours." Finally, a few questions were open-ended to ascertain the type of information they sought on Caring~Web and linked websites they accessed.

Results

Results for the bi-monthly and Survey questions are interspersed throughout the following sections.

Participants

Thirty-six web users completed the RCT and its bi-monthly interviews plus the website evaluation Survey. Five web users chose to use their own computer with Internet access, while the rest of the web users chose to use MSN WebTV™. The typical web user was female, the spouse of the care recipient, about fifty-four years old, had thirteen years of schooling, and was white (see Table 1) (Pierce, et al., 2007; Pierce, et al., 2009).

Usage

There were 7,121 total visits to the Caring~Web intervention website. Most participants visited the site around ten to fifteen times per month, although a few were more frequent users of the site. An analysis of the Survey data revealed that, on average, participants used the Caring~Web intervention one to two hours per week. However, website usage declined after several months. One caregiver participant shared why his usage was initially higher, "before my wife had the stroke, I didn't know anything about...stroke. The nurse (other professionals) and people in the group have helped me tremendously."

Design

Overall, the majority of the participants rated the Caring~Web site positively.

Appearance—All the participants agreed or strongly agreed that they liked the way the web pages looked. Visual components of Caring~Web site, such as print size and colors, were rated favorable (see Table 2).

Usability—Thirty-one (86%) of the participants agreed that the services from Caring~Web were needed. All of the participants agreed or strongly agreed that they were satisfied with Caring~Web. All but one of the participants (97%) said that they would recommend Caring~Web to a friend caring for a person with stroke. Thirty-three participants (92%) indicated that the directions on the web pages were clear. Thirty-four participants (94%) also reported that it was easy to move around the site.

The participants felt that they were trained well, had few technical problems, and found the users' guide easy to follow and helpful (see Table 2). Some participants reported trouble with passwords and signing on. Occasionally, the MSN WebTV™ network or other service providers were down for a period of time, keeping participants from accessing the Caring~Web site. A few issues resolved themselves without any effort by the participant. Restarting a program or rebooting the machine was also helpful in most cases. The majority of responses to the question about technical problems involved issues related to the slow speed in moving around the site and taking a long time to load the Caring~Web site in their web browser on their own personal computer. Participants forgot to change batteries in the MSN WebTV™ keyboards which accounted for some of the complaints concerning this equipment. Participants also mentioned printer problems such as putting paper in, changing ink and toner cartridges, and that it simply was not working. However, the computer technician was able to troubleshoot the problems over the telephone. All problems that the participants had with the equipment, directions for use, or the Internet service provider were resolved.

Usage and Design of Specific Intervention Components

Fifteen participants (42%) posted to Caretalk, the non-structured discussion group, less than once per week and 7 participants (19%) never posted at all. However, 8 participants (22%) posted once per week and 6 of them (17%) posted more than once per week. One participant said that she felt uncomfortable with Caretalk, believing that she was "partaking in gossip and being nosy." Twenty-nine participants (76%) stated that they strongly agreed or agreed that they learned a lot from Caretalk. More than once per week, 15 participants (42%) reported that they read messages on Caretalk without responding. Only 7 participants (19%) reported problems using Caretalk. Participants choosing to use their own computer equipment noted the most problems with Caretalk since different Internet service providers were used to access the site. The personal computer participants were also vulnerable to viruses affecting their ability to participate in the Caring~Web intervention and its components.

Participants were encouraged by the nurse specialist to use Caretalk to ask their questions so that all caregivers could learn from the answers. Consequently, 27 participants (75%) used Ask the Nurse, where caregivers could ask specific questions of the nurse specialist, less than once per week and 7 participants (19%) did not use it at all. Even though 7 participants did not use Ask the Nurse, some of them still rated its usefulness. Thirty-three participants (92%) stated that they learned a lot and had all their questions answered. Only two participants (6%) reported any problems in using Ask the Nurse. These two caregivers felt that their questions were not adequately answered by the nurse specialist.

On average, the participants used the Educational Links or information from other reliable websites once per week during the yearlong RCT. Thirty-one participants (86%) strongly agreed or agreed that they learned a lot from the Educational Links. Thirty-four (95%) participants thought that the Educational Links pages were easy to use. Participants said that they were looking for information on coping with life after the stroke that included: 1) dealing with the health-related deficits of their care recipient (person with stroke), 2) making life as normal as possible and 3) adjusting to the changing relationship of the caregiver and care recipient. In addition to these health-related topics, participants also accessed news and information on hobbies such as cooking, family trees or genealogy, gardening, and games. Some participants responded that they did not search for topics due to having limited time in their busy schedule. However, all participants agreed that they read the customized monthly educational Tips and printed them.

Discussion and Conclusion

The usage, as well as design, of Caring~Web[®] was evaluated via objective methods, visits to the website, as well as subjective bi-monthly questions and a Survey asked in a telephone interview. Caregivers accessed many Educational Links that helped them cope with life after stroke. Information on stroke prevention, health maintenance, medications, co-morbid conditions, as well as adaptive equipment was helpful to these caregivers. Websites which helped caregivers maintain a satisfying interpersonal relationship with the care recipient, such as links to information on sexuality, and depression and anxiety, were used but could also be expanded upon in a revision of the Caring~Web stroke intervention website. These findings reflect that caregivers are reaching out to access healthcare information through the Internet; however, these caregivers also wanted information that lightened their burden of caring for a loved one (NCA, 2009). Caregivers enjoyed a wide variety of links related to news and hobbies. Exemplars include links to weather, news, jokes, and games that aided the caregivers in sustaining their daily routine and thus maintaining as normal of a life as possible.

As demonstrated by this evaluation, training caregivers to use websites or equipment is important, especially with novice users. Caregivers in this RCT were offered the free use of MSN WebTV[™] or could use their personal computer. Most of the technical problems experienced were related to the caregivers' own computers and email systems of which the investigators had little control. However, technical support was provided for these caregivers and was found to be helpful. Although caregivers were given a user's manual, "help" and/or "how to" videos could also be incorporated onto the website in the future for troubleshooting problems.

Caregivers reported having limited time in their daily schedules to spend on Caring~Web and to access all its components. Current technology, such as mobile access devices (e.g., smart phone, iPod, or iPad) would provide immediate access to the site. Caretalk and Ask the Nurse could be engaged through voice, email, or text messages on these devices. Although some questions may be answered with a brief text response, other more sensitive questions may require other means of communication, such as in-depth email responses. Adding a quick reference link to the most discussed topics on the Caretalk or Ask the Nurse components and the most used Educational Links and/or monthly educational Tips would also be of benefit for caregivers.

Similar to other stroke websites (Korner-Bitensky, et al., 2008; Rochette, et al., 2008) and previous assessment of the Caring~Web intervention website with adult computer students (Steiner, et al., 2004), the results of this evaluation found Caring~Web to be a helpful stroke intervention website. Caring~Web was found to be easy to use and contain valuable content (Steiner, et al., 2004). Caring~Web provided an engaging atmosphere within a supportive environment that helped these family caregivers feel comfortable in caring for persons with stroke. Based on the RCT findings, these caregivers gained needed information for challenging situations that arose and also identified useful life coping strategies for providing care (Pierce, et al., 2007). Caregivers used each of the intervention components and rated them highly, perhaps indicating a multicomponent intervention is more beneficial than a single factor intervention (Gitlin, et al., 2003).

A limitation of this evaluation is that the caregivers' very positive ratings about the website may be due in part to the fact that they were interviewed by the same interviewer over the yearlong RCT and this relationship may have caused them to be less critical in their rating of the website. Another limitation of this evaluation is that these results may not be representative of a larger group of caregivers who could use Caring~Web, since these

caregivers were mostly of the same ethnicity and from only two Midwestern states. Regardless, this information can be used to alter the Caring~Web for future use. Finally, the visits data were not archived after the RCT was completed and, consequently, further analyses with these data are not possible.

Similar to other studies, this website usage and design evaluation employed a subjective Survey (Dew, et al., 2004; Evangelista, et al., 2006; Rotondi, et al., 2005). Due to the limitations indicated, future research could be done with more diverse focus groups or navigational tasks (Boyd & Archer, 2007; DeBate, et al., 2009). Since website usage declined over time, focus groups could be conducted to determine what they liked about a site design as well as what would help keep caregivers engaged in an intervention or if they may not need an intervention as often once they are more experienced caregivers (DeBate, et al., 2009). Navigational tasks could also be a more objective measure of ease of use of the site than the Survey. These tasks could include observing caregivers while they search for information on depression related to caring for a person with stroke or how to decrease falls in the home (Boyd & Archer, 2007).

Knowing that these caregivers used Caring~Web[®] and evaluated the design of the website positively is particularly important since upon completion of the RCT, the intervention was opened to everyone on the World Wide Web. The site is maintained by the university medical center and primarily marketed to its clients at discharge from the center. Two of the primary components, Caretalk and Ask the Nurse, are restricted to the center's clients. During a recent 15 month period, there were 19,431 total visits to the site. Family caregivers, as well as healthcare providers, can access Caring~Web anytime at <http://caringweb.utoledo.edu/> for general information related to dealing with stroke and its outcomes. Other website designers and healthcare professionals can also replicate this web-based multi-component intervention for other health conditions.

Acknowledgments

The intervention used in this study, Caring~Web[®], was supported by a grant (RO1 NR007650) from the National Institute of Nursing Research (NINR). Support for implementation of Caring~Web at the medical center was also provided by a Strategic Enhancement Award from the University of Toledo. The family caregivers are thanked for their participation. The contributions of our research team members as well as Mary Peters, Kevin Weber and Caren Oyor, previous research assistants, are recognized. Sherry Andrews, Director for the Center for Creative Instruction at the university, is thanked for her technical review of this manuscript.

References

- An L, Schillo B, Saul J, Wendling A, Klatt C, Berg C. Utilization of smoking cessation informational, interactive, and online community resources as predictors of abstinence: cohort study. *J Med Internet Res*. 2008; 10(5):e55. [PubMed: 19103587]
- Boyd L, Archer F. Developing a web-based education program for people with asthma in rural and remote areas. *J Emerg Prim Health Care*. 2007; 7,5(4) Retrieved from http://www.jephc.com/full_article.cfm?content_id=452.
- Chang B. Nursing informatics: Internet intervention for community elders: Process and feasibility. *West J Nurs Res*. 2004; 26(4):461–466. [PubMed: 15155029]
- DeBate R, Severson H, Zwald M, Shaw T, Christiansen S, Koerber A, Tedesco L. Development and evaluation of a web-based training program for oral health care providers on secondary prevention of eating disorders. *J Dent Edu*. 2009; 73(6):718–29.
- Dew M, Goycoolea J, Harris R, Lee A, Zomack R, Dunbar-Jacob J, Rotondi A, Griffith B, Kormos R. An internet-based intervention to improve psychosocial outcomes in heart transplant recipients and family caregivers: Development and evaluation. *J Heart Lung Transplant*. 2004; 23(6):745–748. [PubMed: 15366436]

- Evangelista L, Stromberg A, Westlake C, Ter-Galstanyan A, Anderson N, Dracup K. Developing a web-based education and counseling program for heart failure patients. *Prog Cardiovasc Nurs*. 2006; 21(4):196–201. [PubMed: 17170595]
- Gerber B, Solomaon M, Shaffer T, Quinn M, Lipton R. Evaluation of an internet diabetes self-management training program for adolescents and young adults. *Diabetes Technol Ther*. 2007; 9(1):60–67. [PubMed: 17316099]
- Gitlin L, Burgio L, Mahoney D, Burns R, Zhang S, Schulz R, Belle S, Czaja S, Gallagher-Thompson D, Hauck W, Ory M. Effect of multicomponent interventions on caregiver burden and depression: The REACH multisite initiative at 6-month follow-up. *Psychol Aging*. 2003; 18(3):361–374. [PubMed: 14518800]
- Glasgow R, Christiansen S, Kurz D, King D, Woolley T, Faber A, Estabrooks P, Strycker L, Toert D, Dickman J. Engagement in a diabetes self-management website: Usage patterns and generalizability of program use. *J Med Internet Res*. 2011; 13(1):e9. [PubMed: 21371992]
- Hill W, Weinert C. An evaluation of an online intervention to provide social support and health education. *Comput Inform Nurs*. 2004; 22(5):282–288. [PubMed: 15520598]
- Internet World Stats. Usage and population statistics. 2011. Retrieved from <http://www.internetworldstats.com/top20.htm>
- Korner-Bitensky N, Roy M, Teasell R, Kloda L, Storr C, Asseraf-Pasin L, Menon A. Creation and pilot testing of StrokEngine: a stroke rehabilitation intervention website for clinicians and families. *J Rehabil Med*. 2008; 40:329–333. [PubMed: 18461256]
- Linke S, Brown A, Wallace P. Down your drink: A web-based intervention for people with excessive alcohol consumption. *Alcohol Alcohol*. 2004; 39(1):29–32. [PubMed: 14691071]
- National Alliance for Caregiving [NAC]. Caregiving in the US. 2009. Retrieved from <http://www.caregiving.org/>
- National Stroke Association [NSA]. Women and stroke. 2012. Retrieved from <http://www.stroke.org/site/PageServer?pagename=WOMCOMP>
- Net Success 2000 Plus Inc. Web design definition. 2011. Retrieved from <http://web-design.createafreewebsite.net/web-site-design-definition.html>
- Nielsen J, Norman D. Usability on the Web isn't a luxury. *Informationweek*. Jan.2000 773:65–69.
- Oenema A, Tan F, Brug J. Short-term efficacy of a web-based computer tailored nutrition intervention: main effects and mediators. *Ann Behav Med*. 2005; 29(1):54–63. [PubMed: 15677301]
- Palmer J. Web site usability, design, and performance metrics. *Information Systems Research*. 2002; 13(2):151–167.
- Pierce L, Steiner V, Govoni A, Hicks B, Thompson T, Friedemann M. Internet-based support for rural caregivers of persons with stroke shows promise. *Rehabilitation Nursing*. 2004; 29(3):95–99. 103. [PubMed: 15152419]
- Pierce L, Steiner V, Govoni A, Thompson T, Friedemann M. Two sides to the caregiving story. *Topics in Stroke Rehabil*. 2007; 14(2):13–20.
- Pierce L, Steiner V, Khuder S, Govoni A, Horn L. The effect of a web-based stroke intervention on carers' well-being and survivors' use of healthcare services. *Disabil Rehabil*. 2009; 31(20):1676–1684. [PubMed: 19479528]
- Rochette A, Korner-Bitensky N, Tremblay V, Kloda L. Stroke rehabilitation information for clients and families: Assessing the quality of the StrokEngine-Family website. *Disabil and Rehabil*. 2008; 30(19):1506–1512.
- Rotondi A, Sinhule J, Spring M. An interactive web-based intervention for persons with TBI and their families. *J Head Trauma Rehabil*. 2005; 20(2):173–185. [PubMed: 15803040]
- Scharer K. An internet discussion board for parents of mentally ill young children. *J Child Adolesc Psychiatr Nurs*. 2005; 18(1):17–25. [PubMed: 15701095]
- Steele R, Mummery K, Dwyer T. Development and process evaluation of an internet-based physical activity behavior change program. *Patient Educ Couns*. 2007; 67:127–136. [PubMed: 17416479]
- Steiner V, Pierce L. Building a web of support for caregivers of persons with stroke. *Top Stroke Rehabil*. 2002; 9(3):102–111. [PubMed: 14523712]

- Steiner V, Pierce L, Hecceg N. Evaluation of Caring~Web by adult computer students. *J Information Technol Healthcare*. 2004; 2(1):41–53.
- Zabinski M, Wilfley D, Pung M, Winzelberg A, Eldredge K, Taylor C. An interactive internet-based intervention for women at risk for eating disorders: A pilot study. *Int J Eat Disord*. 2001; 30(2): 129–137. [PubMed: 11449446]

Table 1

Demographic profile of the web users group of caregivers (n=36).

Characteristics	Sub-Characteristics	Caregivers	
		n	%
Gender	Male	11	30.6
	Female	25	69.4
Age (in years)	20 – 30	0	0
	31 – 40	6	16.7
	41 – 50	6	16.7
	51 – 60	11	30.6
	61 – 70	8	22.2
	71 – 80	5	13.9
	81 – 90	0	0
Relationship	Wife	15	41.7
	Husband	9	25.0
	Daughter	6	16.7
	Son	1	2.8
	Other Relatives and Friends	5	13.8
Race/Ethnicity	American Indian or Alaskan Native	0	0
	Asian/Pacific Islander	0	0
	Black not of Hispanic origin	4	11.1
	Hispanic	1	2.8
	White not of Hispanic origin	31	86.1
	Other	0	0
Education (in years)	None	1	2.8
	Grade School (1 – 8)	4	11.1
	High School (>8 – 12)	10	27.8
	College (>12 – 16)	15	41.7
	Graduate School (>16)	6	16.7

Table 2

Evaluation of website appearance and usability reported by caregivers (n=36).

Evaluation Question	Strongly Agree		Agree		Disagree		Strongly Disagree	
	n	%	n	%	n	%	n	%
Appearance								
Liked web pages look	9	25.00%	27	75.00%	0	0.00%	0	0.00%
Print large enough	14	38.89%	19	52.78%	3	8.33%	0	0.00%
Colors easy to see	12	33.33%	23	63.89%	1	2.78%	0	0.00%
Usability								
Directions on web pages clear	11	30.56%	22	61.11%	3	8.33%	0	0.00%
Easy to move around site	8	22.22%	26	72.22%	2	5.56%	0	0.00%
Trained adequately to use Caring-Web	12	33.33%	23	63.89%	1	2.78%	0	0.00%
Found user's guide helpful	13	36.11%	22	61.11%	1	2.78%	0	0.00%
Found user's guide easy to follow	12	3.33%	24	66.67%	0	0.00%	0	0.00%
Had technical problems	0	0.00%	8	22.22%	16	44.44%	12	33.33%
Technician responded to problems within 24 hours	6	16.67%	24	66.67%	2	5.56%	4	11.11%