

The Impact of Web Based Education on Cancer Patients' Clinical Outcomes

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Abstract—Cancer is a widespread disease in the world and is the third reason of deaths among the chronic diseases. Educating patients and caregivers has a vital role for empowering them in managing disease and treatment's symptoms. Informing of the patients about their disease and treatment process decreases patient's distress and decisional conflicts, improves wellbeing of them, increase success of the treatment and survival. In this era, technological education methods are used for patients that have different chronic disease. Many studies indicated that especially web based patient education such as chronic obstructive lung disease; heart failure is more effective than printed materials. Web based education provide easiness to patients while they are reaching health services. It also has more advantages because of it decreases health cost and requirement of staff. It is thought that web based education may be beneficial method for cancer patient's empowerment in coping with the disease's symptoms. The aim of the study is evaluate the effectiveness of web based education for cancer patients' clinical outcomes.

Keywords—Cancer Patients, E-Learning, Nursing, Web Based Education.

I. INTRODUCTION

CANCER is the most common health threatening disease worldwide. According to the World Health Organization (WHO) GLOBOCAN estimates; there were 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people that have cancer (within 5 years of diagnosis) in 2012 worldwide [1]. Cancer patient education plays an important role in strengthening patients and families with cancer [2]. Healthcare reforms and policies in many countries have emphasized the need to support patients in taking a more active role in managing their diseases [3]. Patient empowerment can contribute to control over patients' health and health behavior [4]. Educating patients about their illness, treatment, side effects' management and improving quality of life can reduce patient anxiety, enhance coping mechanisms, reduce decisional conflicts, promote patient autonomy and improve the experience for patients and families [2]. It provide to patients achieve that self-monitoring, self-efficacy and getting solution skills about their health problems [5].

Web based educational interventions are used as a medium to promote the exchange of patient education information [6]. Computer and web based programs can deliver decision aids and information to more people than traditional formats,

provide social media features for support, and facilitate behavior change in cancer care [7]. Its another advantage is patients could ask to provide information or pose questions via a questionnaire to trigger either standardized or tailored feedback from the health care system by the web based instruments [4]. It is known as an effective tool for nurses to use with patients as it offers a variety of advantages over printed materials. For instance, a meta-analysis comparing web-based and non web based information interventions has shown enhanced outcomes among individuals using web-based interventions, particularly in the areas of knowledge and targeted behavior change [8]. Web-based education can provide guidance, information, and encouragement for patients and families with geographic or time restrictions [9]. Moreover, web based interventions have the potential to augment care giving training for management of cancer diseases [10]. Additionally use of web-based information has been shown to be a cost-effective means for delivering specialized health care services to patients following hospital discharge [11].

Web based interventions can be implemented in various types into cancer patient's care. For cancer survivors, other e-learning initiatives do exist, such as online support groups, online patient education programs, informative tools for decision and various mobile apps that could be used independent of provider activities [4], [12]. Apart from being used for patient information and education, it can be used for the relationship of patients each other. Stanton and colleagues conducted a randomized controlled trial "Project connect online: randomized trial of an internet-based program to chronicle the cancer experience and facilitate communication" and created a personal web sites to chronicle their experience and communicate with their social network for patients with breast cancer. This study's result showed that the participants of intervention group experienced less depressive symptoms, increased positive mood, life appreciation and perceived strengthened relationships than control group [13]. It can be said that different types of web based interventions should be used to support cancer patients well being.

Web based education may become an important tool to support nursing care that can equip cancer patients to better manage their illness. It allows patients to stay connected with cancer nurses as well as provide emotional support, was designed to improve emotional well-being and self-efficacy and decrease depression [8]. In a study conducted by O'Conner-Von (2009) showed that web based education gives nurses the opportunity to meet the challenge of providing ongoing education for patients/families and education about

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the importance of self-care, screening, transition to adult care and healthy coping skills could potentially improve the patients' quality of life [14]. A review of 24 randomized controlled trials that summarized the effects of different interactive health communication applications for people with chronic diseases concluded that they have a significant effect on knowledge, perceived social support, health behaviors, clinical outcomes and self-efficacy [15].

II. AIM

The aim of this review is to determine the impact of web based education on cancer patients' clinical outcomes.

III. METHODS

We conducted a systematic literature review to evaluate the study results about web based education on cancer patients' clinical outcomes. Akdeniz University center electronic databases including Medline, CINAHL e.g. were searched in English with "web based education", "e-learning" "cancer" and "cancer patients' education" key words. Randomized controlled trials have been elected to the study. Also references of the determined studies were reviewed.

IV. RESULTS

In the recent literature review, there are seven studies about web based education on cancer patients' clinical outcomes.

A study conducted with women who have early stage breast cancer showed that participation in the self-guided internet coping group would result in improved quality of life. Its results pointed out women who believe that their health situation has been impacted by the disease are most likely to benefit from participation to the intervention group. While the other findings of the study showed that there was no main effect of the intervention to the treatment, positive changes had occurred about quality of life and lower expression of health-related concerns [16].

The study "Web-Based Tailored Education Program for Disease-Free Cancer Survivors With Cancer-Related Fatigue: A Randomized Controlled Trial" was conducted to determine whether an internet based tailored education program is effective for cancer related fatigue by Ho Yun and colleagues (2012). Results of the study pointed out the intervention group experienced a greater decrease in fatigue and anxiety. Patients' quality of life was detected higher in the intervention group [17].

Within a prospective randomized clinical trial, a program was developed to improve communication between cancer patients and their oncologists to support the patients' decision-making skills by Meropol and colleagues (2013). It indicated that computer-based communication skills training can positively affect cancer patients' satisfaction about communication and decision-making. The participants of the study reported that the program helped them to decide about their treatment skills and improved their satisfied with their decisions [18].

Donovan and colleagues (2014) had improved a web based

interaction program via messages between nurse and study participant for symptom management of cancer patients. The results of the study showed that there was significant difference between the groups about symptom severity. Additionally, repeated measures analysis also supported the result that intervention group had lower symptom distress [19].

Vogel and colleagues conducted a randomized controlled study "Development and pilot of an advance care planning website for women with ovarian cancer: A randomized controlled trial" to develop a web based tool to promote advance care planning for women with ovarian cancer. A website was created to address advance care planning, focusing on advance healthcare directives and palliative care consultation. Its results revealed that women in the intervention group showed evidence of moving toward decision making regarding advance healthcare directives and palliative care and lower decisional conflict. Women assigned to the intervention, compared to control website, were highly satisfied with the amount and quality of information and when they accessed the website used it longer. They concluded that a website providing information and decisional support for women with ovarian cancer is feasible [7].

From the other side, the results of another randomized controlled study conducted to evaluate the effect of an internet based program on breast cancer patient's empowerment process showed that there were no difference between two groups. According to the study, internet based Breast Cancer Patient Pathway Program didn't decrease anxiety level or side effects of treatment among breast cancer patients. Additionally, the results showed that the program didn't improve subscales of quality of life the intervention group when compared with controls [20].

Weinberg and colleagues conducted a randomized controlled study with 904 women to compare of print and web communication on colorectal cancer screening. Its result showed that the web based educational intervention was no more effective than a print-based one or control in increasing colorectal cancer screening rates in women at average risk of colorectal cancer. Risk messages tailored to attentional style had no effect on screening uptake [21].

V. CONCLUSION

At the end of the review, it can be said that web based patient education programs increase cancer patients' knowledge level, self-reported health status, satisfied with their communication and decision making skills, self-efficacy, quality of life and decrease their symptom frequency and severity. Therefore, nurses can implement web based education resources into cancer patients' care to enhance health status of cancer patients [22]. However, some of the studies' results showed no effectiveness of web based interventions to patient outcomes. For this reason, we can offer two proposals clearly. One of them is about more randomized controlled study requirement that show the impact of the web based interventions to patient clinical outcomes.

The other one of the proposals is e-learning strategies should be used with traditional patient teaching methods.

There is increasing literature on the use of web based patient education for chronic disease such as heart failure, diabetes mellitus or pressure ulcer; there is a paucity of research on web based patient education specifically designed for cancer patients [23]-[26]. In this way, although lots of studies have shown that effects on knowledge and behavior change were higher for individuals using a web based intervention than for individuals using a non web based intervention more work is needed to determine whether this also applies to cancer survivors [4], [8]. Therefore, there is an important need to experimental studies to illuminate the effectiveness of web based education for cancer patients worldwide. Furthermore, there is need to studies about web based interventions that focus on cancer caregivers' needs and support them on giving care to their patients appropriately.

Web-based health interventions focus on encouraging increased and prolonged use for cancer survivors [27]. As a consequence of that, patients' follow requires long time and adherence. However, cancer survivors can lose their interest because of the effects of cancer, related treatment and distance to health provider [28]. So that, drop out of patients can occur from web based education programs. Dropout can refer to patients being lost to follow-up or to patients not using the intervention. To prevent the dropout patient follow up during the web based education; peer support, counselor support, email and phone contact, frequent website updates, record keeping, and individualized feedback were related to sustained intervention should be used [29], [30].

To conclusion, randomized controlled trials needed that evaluate the effectiveness of web based education programs on cancer patients' health status and their caregivers' encouragement and enhancement to improve patients' clinical outcomes.

REFERENCES

- [1] World Health Organization (WHO) GLOBOCAN Estimated Cancer Incidence, Mortality and Prevalence Worldwide in 2012, Retrieved from http://globocan.iarc.fr/Pages/fact_sheets_cancer_02.02.2014.
- [2] Cancer Care Nova Scotia, Patient Education Fundamentals. Retrieved from http://www.cancercare.ns.ca/site-cc/media/cancercare/Patient%20Education%20Fundamentals_05.02.2014.
- [3] C.M. Ruland, T. Andersen, A. Jeneson, S. Moore, G.H. Grimsbø, E. Børøsund, M.C. Ellison, "Effects of an internet support system to assist cancer patients in reducing symptom distress: a randomized controlled trial", *Cancer Nursing*, vol. 36, pp. 6-17, 2013.
- [4] W. Kuijpers, W.G. Groen, N.K. Aaronson, W. H. van Harten, "A Systematic Review of Web-Based Interventions for Patient Empowerment and Physical Activity in Chronic Diseases: Relevance for Cancer Survivors. A Randomized Controlled Trial", *Cancer Nursing*, vol. 36 (1), pp.6-17, 2013.
- [5] N. Poolsup, N. Suksomboon, S. Rattanasookchit, "Meta-analysis of the benefits of self-monitoring of blood glucose on glycemic control in type 2 diabetes patients: an update", *Diabetes Technology&Therapeutics*, vol. 11 pp. 775-784, 2009.
- [6] T. L. Webb, J. Joseph, L. Yardley, S. Michie, "Using the internet to promote health behavior change: A systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy", *Journal of Medical Internet Research*, vol. 12, e4, 2010.
- [7] R.I. Vogel, S.V. Petzel, J Cragg, M. McClellan, D. Chan, E. Dickson, J.A. Jacko, F. Sainfort, M.A Geller, Development and pilot of an advance care planning website for women with ovarian cancer: a randomized controlled trial. *Gynecol Oncol.* vol.131(2):430-6, 2013.
- [8] D.J. Wantland, C.J. Portillo, W.L. Holzemer, R. Slaughter, E.M. McGhee, "The effectiveness of Web-based vs. non-Web-based interventions: a meta-analysis of behavioral change outcomes", *Journal of Medical Internet Research*, vol. 6, e40, 2004.
- [9] B. Brillhart, "Internet education for spinal cord injury patients: Focus on urinary management" *Rehabilitation Nursing*, vol. 32, pp. 214-219, 2007.
- [10] J. Reis, B. McGinty, S. Jones, "An e learning caregiving program for prostate cancer patients and family members", *J Med Syst.* vol.27(1), pp.1-12, 2003.
- [11] J. Côté, P. amirez Garcia, G. Rouleau, D. Saulnier, Y.G. Guéhenec, A. Hernandez, G. Godin, "A nursing virtual intervention: Real-time support for managing antiretroviral therapy", *Computer, Informatics, Nursing*, vol. 29, pp. 43-51, 2011.
- [12] A.M. Ryhänen, M. Siekkinen, S. Rankinen, H. Korvenranta, H. Leino-Kilpi, "The effects of Internet or interactive computer-based patient education in the field of breast cancer: a systematic literature review", *Patient Educ Couns* vol.79(1), p.5-13, 2010.
- [13] A.L. Stanton, E.H. Thompson, C.M. Crespi, J.S Link, J.R. Waisman, "Project connect online: randomized trial of an internet-based program to chronicle the cancer experience and facilitate communication", *J Clin Oncol.* vol.31(27), p.3411-7, 2013.
- [14] S. O'Conner-Von, "Coping with Cancer: A Web-Based Educational Program for Early and Middle Adolescents" *Journal of Pediatric Oncology Nursing*, vol 26, pp 230-241, 2009.
- [15] E. Murray, J. Burns, T.S. See, R. Lai, I. Nazareth, "Interactive health communication applications for people with chronic disease", *Cochrane Database Systematic Review*, 2005.
- [16] J.E. Owen, J.C. Klapow, D.L. Roth, J Jr, Shuster, J. Bellis, R. Meredith, D.C. Tucker, "Randomized pilot of a self guided internet coping group for women with early-stage breast cancer", *Annals of Behavioral Medicine*, vol. 30, pp. 54-64, 2005.
- [17] Y. Ho Yun, S.K. Lee, Y.W. Kim, Y. Sang Park, E.S. Lee, et al. "Web-based tailored education program for disease-free cancer survivors with cancer-related fatigue: a randomized controlled trial", *Journal Of Clinical Oncology* vol. 30, pp. 1296-1303, 2012.
- [18] N.J. Meropol, B.L. Egleston, S.J. Buzaglo, A. Balslem, A.B. Benson, et al. "A web-based communication aid for patients with cancer (The CONNECT Study)", *Cancer*, vol. 119, pp. 1437-1445, 2013.
- [19] H.S. Donovan, S.E. Ward, S.M. Sereika, J.E. Knapp, P.R. Sherwood, et al. "Web-Based Symptom Management for Women With Recurrent Ovarian Cancer: A Pilot Randomized Controlled Trial of the WRITE Symptoms Intervention" *Journal of Pain and Symptom Management*, vol. 47, pp. 218-230, 2014.
- [20] A.M. Ryhänen, S. Rankinen, M. Siekkinen, M. Saarinen, H. Korvenranta, et al. "The impact of an empowering Internet-based Breast Cancer Patient Pathway program on breast cancer patients' clinical outcomes: a randomised controlled trial" *Journal of Clinical Nursing*, vol. 22, pp. 1016-1025, 2013.
- [21] D.S. Weinberg, E. Keenan, K Ruth, K Devarajan, M Rodoletz, E.J. Bieber, "A randomized comparison of print and web communication on colorectal cancer screening", *JAMA Intern Med*, 28;173(2):122-9, 2013.
- [22] Y. Hong, N.C. Peñna-Purcell, M.G. Ory, "Outcomes of online support and resources for cancer survivors: A systematic literature review", *Patient Education and Counseling*, vol. 86, pp. 288-296, 2012.
- [23] S. Fredericks, G. Martorella, B. Swart, E. Newman, "Designing a cardiovascular surgical web-based patient education intervention: A discussion paper" *Journal of Nursing Science*, vol. 31, 2013.
- [24] L. Morente, J.M. Morales-Asencio, F.J. Veredas, "Effectiveness of an e-learning tool for education on pressure ulcer evaluation" *Journal of Clinical Nursing*, DOI: 10.1111/jocn.12450, 2013.
- [25] H.S. Kim, "Impact of web-based nurse's education on glycosylated haemoglobin in type 2 diabetic patients" *Journal of Clinical Nursing*, vol 16, pp. 1361-1366, 2007.
- [26] N.T. Artinian, J.K. Harden, M.W. Kronenberg, J.S. Vander Wal, E. Daher, et al. "Pilot study of a web-based compliance monitoring device for patients with congestive heart failure", *Heart & Lung*, vol. 32, pp. 226- 233, 2003.
- [27] J.Y. Han, R.P. Hawkins, B.R. Shaw, S. Pingree, F. McTavish, D.H. Gustafson, "Unraveling uses and effects of an interactive health communication system", *J Broadcast Electron Media*, vol.53(1), p.112-33, 2009.

- [28] G.G. Bennett, R.E. Glasgow, "The delivery of public health interventions via the Internet: actualizing their potential" *Annu Rev Public Health*, vol.30 p.273-292, 2009.
- [29] W. Brouwer, W. Kroeze, R. Crutzen, J. de Nooijer, N.K. de Vries, J. Brug, et al. "Which intervention characteristics are related to more exposure to internet-delivered healthy lifestyle promotion interventions? A systematic review", *J Med Internet Res*, vol.13(1), p.e2, 2011.
- [30] J.R. Schubart, H.L. Stuckey, A. Ganeshamoorthy, C.N. Sciamanna, "Chronic health conditions and internet behavioral interventions: a review of factors to enhance user engagement", *Comput Inform Nurs*, vol.29(2 Suppl), p.9-20, 2011.