RESEARCH ARTICLE

Effectiveness of Online Education in Teaching Breast Self-Examination

Arzu Tuna[1], Elif Unsal Avdal[2], Sebnem Cinar Yucel[3]*, Nursel Alp Dal[1], Aklime Dicle[5], Arife Ozkan[1], Handan Sezgin[1], Aysun Babacan Gumus[1], Ayse San Turgay[1], Mustafa Degirmenci[4]

Abstract

<u>Background</u>: This research evaluated the effectiveness of an online education model in teaching breast self-examination to university staff and students. <u>Materials and Methods</u>: 1,679 women participated in a breast self-examination online training program. Breast self-examination knowledge evaluation forms developed by Maurer (1997) were used in the research and were evaluated on a 100 point scale. Paired t-test and McNemar's Test statistics were employed. <u>Results</u>: The participants scored an average of 46.5 (14.0%) on knowledge on breast self-examination before training, but 77.4 (11.0%) one month after education and 76.7 (9.52%) after six months. There was a clear significant difference between these knowledge levels (p<0.05). Similarly, while the rate for systematic practice of breast self-examination among women was 30.8% before training it increased to 47.8% afterwards. Again the difference was significant (p<0.05). <u>Conclusions</u>: Online education is an effective method for teaching breast self-examination to women.

Keywords: Breast self-examination - online education program - women - university environment - Turkey

Introduction

Cancer is one of the most important diseases threatening human health today. According to the American Cancer Association, breast cancer is the most commonly encountered type of cancer in women, with 57 650 in situ breast cancer cases diagnosed and 39 520 deaths from breast cancer expected (ACS, 2014). Breast cancer is the most common cancer in women in Turkey as well as in the world. Cancer incidence reaches a maximum level of 16.7% in the 45-49 age groups (Ozmen, 2013; Bilge and Keskin 2014). Breast cancer is rare before the age of 30, but shows a rapid increase in the reproductive years following this age. This increase continues steadily following menopause (DeSantis et al., 2014).

Breast cancer is one of the few cancers which can be scanned for and for which early diagnosis is possible. The diagnosis and treatment of breast cancer requires a multidisciplinary approach. Breast cancer is a tumor for which treatment has been shown to improve survival rates (ACS, 2014; Miller et al., 2014). Mammography, examination by a specialist, and regular monthly breast self-examination (BSE) are important in the early diagnosis of breast cancer (Miller et al., 2014). However,

in a developing Islamic country like Turkey, women may delay an examination by the doctor for breast cancer, and may shy away from having a mammography or an examination by a specialist. For this reason it is necessary to motivate women to perform breast self examinations on a regular monthly basis from the age of 20, and to keep their information up-to-date (Malak and Dicle, 2007; Isara and Ojedokun 2011; Salama et al., 2013; Tsangari et al., 2014).

Even though breast self examination is a simple operation which takes little time and is without cost, it is performed by few women, or not on a regular basis. It is reported that when women perform BSE, they are hindered by not knowing the correct method, thinking that they do not have enough time to carry out a difficult technique, or the fear of finding any kind of lump (Karadag, 2014). Studies have shown that health beliefs are one of the most important factors affecting whether women scan for breast cancer. Because beliefs have an effect on health behavior, the Health Belief Model (HBM) was used to create the theoretical framework for studies of behavior towards breast cancer screening such as BSE (Baysal and Polat, 2012; Erbil and Bolukbas, 2012; Fouladi et al., 2013; Tsunematsu et al., 2013; Yilmaz et al., 2013;

[1]School of Health, Onsekiz Mart University, Çanakkale, [2]Faculty of Health Science Izmir Katip Celebi University, [3]Department of Fundamentals of Nursing, Faculty of Nursing, Ege University, [4]Department of Medical Oncology, İzmir Tepecik Researc Hospital, Izmir, [5]Faculty of Health Science, Istanbul Sabahattin Zaim University, Istanbul, Turkey *For correspondence: sebnemcinar@gmail.com

Avci et al., 2014; Yucel et al., 2014). This model was developed by psychologists in America in the 1950s. In the model, there are four concepts which are believed to affect protective health behavior: perceived susceptibility, importance accorded, seriousness, benefits and barriers. In 1988, Becker and Rosenstock added the concept of health motivation and trust. In the Health Belief Model, an individual's adequacy in applying a health behavior is indicated by six concepts: (a) perceived susceptibility: the perception of a potential danger in a person's health condition; (b) perceived seriousness: the worry created in a person by a threatening situation and the perception of the harmful consequences of a threatening situation; (c) perceived benefits: the perceived positive aspects in the formation of protective behavior; (d) perceived barriers: the perceived negative aspects in the formation of protective behavior; (e) health motivation: the general intention and desire to form behaviors to maintain and develop health; (f) confidence (self-effectiveness). According to the HBM, women who are more sensitive to breast cancer and who perceive breast cancer as a serious situation will perform BSE more (Karayurt and Dramalı, 2007; Yucel et al., 2014).

Television, radio and new technological developments such as the internet affect women's health beliefs with regard to the early diagnosis of breast cancer in a positive way, and increase their motivation (Kim et al., 2001; Yi et al., 2008; Heo et al., 2013; Kratzke and Wilson, 2013).

Novelties of the technological age have increased the interest of health workers on this topic. For this reason, educational programs are being developed in the internet environment for both sick and healthy individuals, and internet information services are being advanced in the field of health. The internet is being used in the development of continuous care and health protection, the monitoring of chronic illnesses, the running of information services, the evaluation of patient satisfaction, and the running of home care services. Health education which is needed by the community can reach people by email or instant messaging. At the same time, communication on the internet is based on security, respect and confidentiality. Social support groups formed on the internet should share their experiences on health education which they have given (Berland et al., 2001; Baker et al., 2003; Valero-Aguilera et al., 2014).

Searching for information on the internet is a commonly-used practice used by university students and working women in particular. Internet sites have been set up to provide correct health information, in Europe and America to protect and improve the health of women, and to combat cancer; health behaviors such as BSE are taught, and information is provided to cancer patients, by means of dialog and email and telephone conversations (Kim et al., 2001; Yi et al., 2008).

Achieving the necessary motivation for women to practice BSE at home and this kind of internet site set up to update information can motivate women to carry out positive health behavior. In addition, keeping up to date an internet environment which would allow working women and university students to keep up their interest in BSE on an internet site where these women work would make it easier for them to carry out BSE. It was for this reason that this research was carried out, so that the academic and administrative staff of Canakkale (18th March) University could receive training in breast self-examination and put into practice the positive health behavior of BSE.

This study was carried out with the purpose of examining the effectiveness of on-line education on breast cancer and breast self-examination in university personnel and students.

Materials and Methods

Setting and Sample

The study was carried out from 2010 to 2013 with the participation of 1679 people in Canakkale (18th March) University. It was thought that academic personnel and first year students of the Medical Faculty and School of Health would have information on this topic, and so sampling was restricted this group and no students were included from other classes.

Procedure

Information on breast cancer and BSE was prepared online and placed in the internet environment, and then emails were sent informing the subjects about the topic. A social networking environment was created where the women could share their experiences and any questions which they wanted to ask. In order to provide information about the research, online brochures and leaflets were prepared and emailed to campus workers.

The women were evaluated before the training, one month after it and again six months afterwards to target the permanence of the information and training. The questions on the questionnaires before and after the education program were collected online and by email. Education on breast cancer and BSE was given online.

Data collection

An Identifying Information Form was prepared by the researchers to collect data on the identifying characteristics of the women who received the education and on their reasons for practicing BSE.

In order to evaluate the women's scores on information on BSE and their skill in applying it, and to collect their views on the program, an Information Evaluation Form developed by Maurer (1997) was used. This consisted of a total of 13 open-ended questions, six of which were on breast structure, and 12 multiple choice questions, 11 of which concerned breast cancer and nine concerned BSE information and practice. The maximum score on the form was 100. The language validity of the forms on the regular application of BSE and program evaluation were checked by three experts, and the views of three experts were taken on content validity (Malak and Dicle, 2007).

The education program contained information on the significance of breast cancer, the risk factors of breast cancer, the importance of BSE and the application of BSE. Online slides, posters and brochures were used as vehicles of education. Help was obtained from computer engineers in the preparation of online material.

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows version 15.0 (SPSS, 2006). Sociodemographic data was evaluated numerically and as percentages, total scores obtained were evaluated by t test, and the regularity of application of BSE by McNemar's test. A p value of <0.05 was considered statistically significant.

Limitations of the research

During the time the education program was available online, no restriction could be placed on people taking part or not taking part in the research.

Ethical considerations

Written permission was obtained from the Medical Faculty and the School of Health for the collection of data. In addition verbal approval was obtained from the students after the aims of the study had been explained, and the principle of confidentiality was respected.

Results

Table 1 shows the sociodemographic data and application of BSE of the women who took part in the study. A total of 1679 women took part in the study. Their mean age was 23.29 (5.29%) and 90.5% were unmarried. The rate of breast cancer in their families or relatives was 9.4%. It was found that 24% of the women had received education on the topic previous to the study, and 30.8% had practiced BSE before the study, although not regularly. Asked about clinical examination and USG or mammography, 98.5% of the women gave a negative answer. When asked why they did not practice BSE regularly, 82.1% replied that they did not know about it, and 13.3% that they believed they wouldn't get cancer.

Table 1. Participants' Sociodemographic Data and Knowledge and Practice of BSE

Peer Trainees' Characteristics	No	%
Mean Age 23.9 (5.29%) min: 17, max: 42		
Marital status		
married	160	9.5
unmarried	1519	90.5
Have you previously had education on breast cancer?		
Yes	403	24
No	1276	76
Does anyone in your family or among your relatives have breast cancer?		
Yes	158	9.4
No	1521	90.6
Do you practice breast self-examination?		
Yes	517	30.8
No	1162	69.2
*Those who answered yes did not practice BSE regularly.		
Have you had a clinical examination by USG or mammography?		
Yes	26	1.5
No	1653	98.5
Reasons for not practicing BSE regularly		
I believed I did not have enough information on the subject	1379	82.1
I thought I would not get breast cancer	223	13.3
I thought that only old women got breast cancer	34	2
I did not think it was necessary	9	0.6
I do not pay enough attention to my health	34	2
n=1679		

Table 2. Participants' Knowledge of BSE before the Education Program and One Month After It (n: 1679)

Knowledge Score	Mean score	Min	Max	t	p
Before the program	46.52 (14.01%)	15	90	-81.23	0.000
One month after the program	77.42 (11.02%)	50	100		

Table 3. Participants' Knowledge of BSE before the Education Program and Six Month After It (n: 1679)

Knowledge Score	Mean score	Min	Max	t	p
Before the program	46.52 (14.01%)	15	90	-69.75	0.000
One month after the program	77.42 (11.02%)	50	100		

Table 4. Participants' Practice of BSE before the Education Program and Six Months After It (n: 1679)

Practice of BSE	Practicing n (%)	Not practicing n (%)	Chi-square (McNemar's test)	p
Before program	517(30.8)	1162(69.2)	801.001	0.000
Six months after program	803(47.82)	876(52.17)		

Step	Education Program Given and Times of Evaluation
Step 1	Online information and motivation on breast cancer and breast self-examination (by means of online brochure and posters, and email) (1 month)
Step 2	Online evaluation before education on breast cancer and breast self-examination * By information form * By information evaluation form (2 months)
Step 3	Online education on breast cancer and breast self-examination (2 months)
Step 4	Online evaluation one month after education * by Information Evaluation Form (2 months)
Step 5	Online evaluation six months after education * by Information evaluation form (2 months)
Step 6	The cycle of this plan was continued for 32 months.

Figure 1. Research Plan

Table 2 shows the scores on knowledge of BSE before the education program and one month after it. The mean score before the program was 46.52 (14.01%). The mean score one month after the education program was 77.42 (11.02%). There is a significant difference in the scores (p<0.05, n=1679).

Table 3 shows the scores of knowledge of BSE before the education program and six months after it. The mean score before the program was 46.52 (14.01%). The mean score six months after the education program was 76.73 (9.52%). The difference in the scores is statistically significant (p<0.05, n=1679).

The proportion of the participants who had received training on BSE before the study was 30.8%, and these women did not practice BSE regularly, while the proportion of those who were regularly practicing BSE six months after the study was 47.82%. This difference is statistically significant (p<0.05, n=1679) (Table 4).

Discussion

Whether or not a person practices breast self-examination depends on that person's age, socio-cultural

status, interaction with peers, knowledge of breast cancer, perception of breast cancer, the existence of breast cancer in the family, the fear of diagnosing breast cancer by BSE, and by the effects of the mass media (Yi et al., 2008; Shaffer et al., 2013; Valero-Aguilera et al., 2014). The results of a study by Yi et al. (2008), support the results of the present study. Despite the fact that 9.4% of the 1679 women who participated in the study had members of their family or relatives with breast cancer, that the age of the group was very low, and that 13.3% believed they would not get breast cancer, it was found that they were receptive to education on breast cancer and BSE from the internet. The proportion who believed that they had insufficient information on the topic before the internet education program was 82.1%. It was found that even though 30.8% of the women reported practicing BSE before the education program, they did not do this regularly every month but only randomly when they thought about it. Six months after the internet program the proportion of those practicing BSE regularly was found to be 47.82%.

Education on breast cancer by health workers may not secure an increase in the regular practice of BSE. For this reason it is necessary to evaluate women's health beliefs and increase their motivation (Karayurt and Dramalı, 2007; Avci et al., 2014; Karadag et al., 2014; Yucel et al., 2014). The results of other studies have also shown the effectiveness of education given in the internet on developing a positive health attitude towards protection against breast cancer and early diagnosis of breast cancer, and on increasing women's motivation to practice BSE (Berland et al., 2001; Kim et al., 2001; Fogel et al., 2002; Fogel et al., 2002; Baker et al., 2003; Yi et al., 2008; Dang et al., 2013; Shaffer et al., 2013; Valero-Aguilera et al., 2014). In the present study, women's scores on knowledge of breast cancer and BSE increased from 46.52 before the internet education program to 76.73 six months after it. The results of this study are similar to the results of other studies in that the women's knowledge remained high for six months after the education program and that they were still practicing BSE six months after the program.

It is thought that the emails sent to the women serving as a stimulus and the ease with which they were reached through the internet were important factors in the increase in positive information and the behavior changes indicated by their knowledge scores and their BSE practicing status.

Concerning the increase in the women's scores in the results of the study, the website giving information on breast cancer and BSE was closed in the period when questionnaires were being given, but reopened after the questionnaire system was closed, so that the women could easily access the internet site within the six months to revise their knowledge. This may be a reason why the women's knowledge scores remained high, and this was a limitation of the study.

To conclude, this study has re-emphasized that the internet, as one of the great revolutionary developments of recent times, can be effective in giving information in the area of health, and in maintaining changes in knowledge and behavior.

Health professionals preparing internet sites aimed at improving knowledge and behavior relating to breast cancer and BSE can use such internet sites in the protection of public health in this area and in the early diagnosis of breast cancer.

Acknowledgements

References

American Cancer Society; Cancer Prevention and Early Detection Facts and Figures 2013.

Avci IA, Kumcagiz H, Altinel B, Caloglu A (2014). Turkish female academician self-esteem and health beliefs for breast cancer screening. *Asian Pac J Cancer Prev*, **15**, 155-60.

Baker L, Wagner TH, Singer S Bundorf MK (2003). Use of the internet and e-mail for health care information results from a national survey. *JAMA*, **289**, 2400-6.

Baysal HY, Polat H (2012). Determination of the breast cancer risk levels and health beliefs of women with and without previous mammography in the eastern part of Turkey. *Asian Pac J Cancer Prev*, **13**, 5213-7.

Berland GK, Elliott MN, Morales LS, et al (2001). Health information on the internet accessibility, quality, and readability in English and Spanish. *JAMA*, **285**, 2612-21.

Bilge U, Keskin A (2014). Breast cancer screening knowledge in a Turkish population education is necessary. *Procedia-Social and Behavioral Sciences*, **116**, 1861-3.

Dang CM, Estrada S, Bresee C, Phillips EH (2013). Exploring potential use of internet, E-mail, and instant text messaging to promote breast health and mammogram use among immigrant Hispanic women in Los Angeles County. *Am Surg*, **79**, 997-1000.

DeSantis C, Ma J, Bryan L, Jemal A (2014). Breast cancer statistics, 2013. *CA: Cancer J Clin*, **64**, 52-62.

Erbil N, Bolukbas N (2012). Beliefs, attitudes, and behavior of Turkish women about breast cancer and breast self-examination according to a Turkish version of the Champion Health Belief Model Scale. *Asian Pac J Cancer Prev*, **13**, 5823-8.

Fogel J, Albert SM, Schnabel F, Ditkoff BA, Neugut AI (2002). Internet use and social support in women with breast cancer. *Health Psychol*, **21**, 398-404.

Fogel J, Albert SM, Schnabel F, Ditkoff BA, Neugut AI (2002). Use of the Internet by women with breast cancer. *J Med Internet Res*, **4**, 9.

Fouladi N, Pourfarzi F, Mazaheri E, et al (2013). Beliefs and behaviors of breast cancer screening in women referring to health care centers in northwest Iran according to the champion health belief model scale. *Asian Pac J Cancer Prev*, **14**, 6857-62.

Heo J, Chun M, Lee KY, et al (2013). Effects of a smartphone application on breast self-examination: a feasibility study. *Health Inform Res*, **19**, 250-60.

Isara AR, Ojedokun CI (2011). Knowledge of breast cancer and practice of breast self examination among female senior secondary school students in Abuja, Nigeria. *J Prev Med Hyg*, **52**, 186-90.

Karadag G, Gungormus Z, Surucu R, Savas E, Bicer F (2014). Awareness and practices regarding breast and cervical cancer among Turkish women in Gazientep. *Asian Pac J Cancer Prev*, **15**, 1093-8.

Karayurt O, Dramalı A (2007). Adaptation of Champion's health belief model scale for Turkish women and evaluation of the selected variables associated with breast self-examination.

Cancer Nurs, **30**, 69-77.

Kim HS, Kim E, Kim JW (2001). Development of a breast self-examination program for the internet: health information for Korean women. *Cancer Nurs*, **24**, 156-61.

Kratzke C, Wilson S (2013). Ethnic differences in breast cancer prevention information-seeking among rural women: will provider mobile messages work? *J Cancer Educ*, **28**. [Epub ahead of print]

Malak AT, Dicle A (2007). Assessing the efficacy of a peer education model in teaching breast self-examination to university students. *Asian Pac J Cancer Prev*, **8**, 481-4.

Miller AB, Wall C, Baines CJ, et al (2014). Twenty five year follow-up for breast cancer incidence and mortality of the Canadian National Breast Screening Study: randomised screening trial. *BMJ*, **348**, 1-10.

Ozmen V (2013). Breast Cancer in Turkey. *Turkiye Klinikleri J Gen Surg-Special Topics*, **6**, 1-6.

Salama H, Elsebai N, Abdelfatah F, Shoma A, Elshamy K (2013). Effects of peer education on the knowledge of breast cancer and practice of breast self-examination among Mansoura University female students. *J Am Sci*, **10**, 253-61.

Shaffer VA, Owens J, Zikmund-Fisher BJ (2013). The effect of patient narratives on information search in a web-based breast cancer decision aid: an eye-tracking study. *J Med Internet Res*, **15**, 273.

SPSS (2006). SPSS for Windows Version 15. SPSS Inc., Chicago, IL.

Tsangari H, Sharaa HM, Fouad NA, Petro W (2014). A cross-cultural comparison between Cypriot and Egyptian women, on their perceptions of breast self-examination as a screening method for breast cancer. *World Appl Sci J*, **31**, 409-19.

Tsunematsu M, Kawasaki H, Masuoka Y, Kakehashi M (2013). Factors affecting breast cancer screening behavior in Japan--assessment using the health beliefmodel and conjoint analysis. *Asian Pac J Cancer Prev*, **14**, 6041-8.

Valero-Aguilera B, Bermúdez-Tamayo C, Garcia-Gutierrez JF, et al (2014). Information needs and Internet use in urological and breast cancer patients. *Supportive Care Cancer*, **22**, 545-52.

Yi M, Kim J, Noh DY, et al (2008). Evaluation of the satisfaction and usefulness of a web-based educational program for breast cancer patients. *Open Med Inform J*, **2**, 129-37.

Yilmaz D, Bebis H, Ortabag T (2013). Determining the awareness of and compliance with breast cancer screening among Turkish residential women. *Asian Pac J Cancer Prev*, **14**, 3281-8.

Yucel SC, Orgun F, Tokem Y, Avdal EU, Demir M (2014). Determining the factors that affect breast cancer and self breast examination beliefs of Turkish nurses in academia. *Asian Pac J Cancer Prev*, **15**, 1275-80.