Engaging Elderly Breast Cancer Patients Through an e-health Intervention: A Case Series Study

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Abstract. The aging population increases the number of new diagnoses of breast cancer and women of all ages experience psychological stress for possible treatment related side effects. To prepare elderly women diagnosed with breast cancer to face the imminent chemotherapy we developed an e-health intervention based on the Stress Inoculation Training (SIT) protocol, lasting two weeks. The online intervention includes 10 sessions to see once a day. The research design is a controlled trial comparing an experimental group, following the online intervention in addition to traditional treatment provided by the hospital, and a control group without treatment. The aim of this contribution is to explore the level of engagement of eight patients through a case series study. Furthermore, the acceptance of the online intervention by elderly patients in terms of perceived pleasantness, usefulness and easiness is assessed. Data show that patients remain in a stable position (mainly ranging from the arousal and the adhesion phases) within the engagement process after two weeks. Furthermore, patients of the experimental group report a good level of acceptance of the e-health intervention. Thus, preliminary results suggest that the e-health intervention is well accepted by elderly patients and that it addresses patients' need of knowing the imminent treatment experience and of understanding how to deal with it.

Keywords: e-health · Patient engagement · Breast cancer · Acceptance
Online intervention

1 Introduction

Breast cancer is the most common cancer in women in the world and its incidence still increases, even if at a slower rate, in women aged over 50 years until age of 80 years [1]. Actually the incidence of breast cancer represents a critical health concern in the growing ageing population and requires specific evidence-based recommendations

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[2, 3]. Among several treatment options, chemotherapy treatment is experienced as distressing and traumatizing for women with different ages [4]. In particular, hair loss, nausea and fatigue are frequently ranked among the first three important side effects for breast cancer patients [5, 6]. Some studies suggest that the possibility of anticipating side effects and developing coping strategies can make the experience less stressful [7, 8].

Therefore, sustaining the engagement of breast cancer patients at different ages represents an important aim [9]. Specifically, according to the model proposed by Graffigna and colleagues, patient engagement can be defined as a processual multi-level experience resulting from conjoint cognitive, emotional and conative orientation of individuals towards their health management and it is composed of four incremental and evolutionary phases [10, 11]. In the *blackout phase*, patients fall into an initial state of emotional, behavioural and cognitive blackout determined by a critical event (the diagnosis or the communication of the upcoming chemotherapy) that appears unexpected and out of their control. The period before the initation of adjuvant chemotherapy may overlap with the second phase of the engagement process (*arousal phase*). Breast cancer patient are hyper attentive for all symptoms their bodies produce and these symptoms can cause patients anxiety. Thanks to the increase of knowledge about the treatment and its related side effects and the acquisition of coping strategies, patients start to feel sufficiently confident in their own emotional strength (*adhesion phase*). At the end of the process, usually after having completed the treatment, breast cancer patients have a chance to recapture a positive life planning oriented to the future (*eudaimonic project phase*).

e-health interventions are recognized to have a tremendous potential to promote patient engagement [12], as they allow to develop integrated, sustainable and patient-centered services, to promote and enhance health and to augment the efficacy and efficiency of the process of healthcare [13]. A recent analysis of the literature identified different e-health approaches aiming to sustain breast cancer women engagement [14]. One is the narrative approach, that typically includes the use of personal websites to help patients to express their emotions and enhance their emotional well-being [15]. A second is the support group approach, that usually aims to enhance social support through online peer support interventions. Recently older women reported that they receive several benefits from using online support groups especially about the feeling of being in control of their health [16]. A third approach proposes online training aimed to help patients to manage their affective state and acquire coping strategies. With this aim, recently Villani and colleagues [17] developed a two weeks e-health intervention based on Meichenbaum's Stress Inoculation Training (SIT) [18] protocol for helping elderly women undergoing chemotherapy to cope with impeding treatment side effects. The protocol was composed by three phases coherent with the general SIT objectives: (1) increasing knowledge about the stress process, (2) developing self-regulation skills and (3) helping individual to use the acquired coping skills in real contexts. The clinical rationale behind this approach is to "inoculate" the stressor in patient's experience, in combination with the acquisition of effective coping skills, so that patients could be prepared when they will encounter the critical experience of chemotherapy.

According to a recent systematic review [19], cyberSIT appears to be a promising clinical approach, and Villani and colleagues tested its effectiveness on anxiety reduction and coping skills improvement with a sample of oncology nurses [20]. Overall, the SIT protocol activates the three components of patient engagement: cognitive (by increasing what the patient knows, understands and how she makes sense of the disease and its treatments), emotional (by developing awareness about patient's own emotional reactions and learning adaptive emotion regulation skills) and behavioral (by stimulating specific activities to face the disease and the treatments, such as coping with hair loss).

As investigated by Fogel and colleagues [21], variables as age, length of time since diagnosis, and breast cancer stage are unrelated to Internet use. Furthermore, an increasing number of women patients of any age are accessing health information on the Internet [22]. Specifically, the acceptance of e-health technologies represents a critical factor influencing their effective use and thus fostering the active role of patients in their healthcare. One of the most influential models in explaining user acceptance of information technology is the Technology Acceptance Model (TAM) [23] that hypothesizes two fundamental factors affecting people's attitudes toward IT and influencing at its turn the intention to use and the actual usage of technologies: *perceived usefulness* and *perceived ease of use*. Furthermore, as analyzed by other studies (Villani et al., in press), the positive affective attitude (*pleasantness*) towards technologies represents an addictional dimension of technology acceptance.

The aim of this contribution is to explore the level of engagement of eight elderly breast cancer patients through a case series study. Furthermore, we are interested in assessing the acceptance of the e-health intervention in terms of perceived pleasantness, usefulness and easiness of the proposed experiences.

2 Method

2.1 Participants

The intervention was proposed to all breast cancer patients which was offered chemotherapy in two hospitals of Milan. Inclusion criteria were: age >55 years old; diagnosis of breast cancer radically operated; negative staging for distant metastases; and suitability for adjuvant chemotherapy with anthracyclines and taxanes. All patients decided voluntarly to participate and they gave written informed consent before being enrolled in the study. Patients were allowed to withdraw from the study whenever they wanted. Ethic approval was attained from the Ethics Committee of Department of Psychology of the Università Cattolica del Sacro Cuore, Milan (Italy).

Eight breast cancer patients were included in the study (Table 1). Patients 1, 2, 3 and 4 followed the e-health intervention for two weeks; patients 5, 6, 7 and 8 were included in the control group without intervention and received the usual care for two weeks. The usual care during the two weeks before chemotherapy consists of waiting for the imminent treatment.

Table 1. Characteristics of patients

	e-health group				Control Group			
	P1	P2	P3	P4	P5	P6	P7	P8
Age	60	58	70	58	66	65	55	58
Education level	High school	Junior high school	M.S. Degree	Elementary school	Elementary school	Junior high school	Junior high school	High school
Marital status	Married	Divorced	Married	Never Married	Married	Married	Married	Married
Occupational status	Employed	Employed	Retired	Housewife	Housewife	Housewife	Employed	Freelance worker

Demographic characteristics included age education level (elementary school, junior high school, high school, M.S. degree); marital status (married, never married, widowed, cohabitation, or divorced) and occupational status (housewife, employed, freelance worker, or retired).

2.2 e-health Intervention

The e-health intervention based on Meichenbaum's SIT intervention [18] aimed to facilitate anticipatory coping of elderly women undergoing chemotherapy. The e-health intervention *Con il seno di poi* (Table 2) has been delivered online (www.conilsenodipoi.it). During the first meeting with the psychologist, patients were invited to reflect on the nature of the psychological stress due to disease and upcoming treatment in order to achieve a greater consciousness about its main components (conceptualization phase of the SIT protocol). In this session patients experienced a live-video simulation of a chemotherapy session that they will receive within a few weeks. Furthermore, they received the access to the online intervention for a period of 14 days. During that time, the psychologist's personal contact has been provided.

2.3 Measures

Patient Health Engagement Scale (PHE-S) developed by Graffigna and colleagues [26] was used to measure patient engagement. Patients fulfilled in the scale with the psychologist before the intervention and at the end of the intervention, after two weeks. The scale consists of 5 ordinal items and is based on a conceptual model of patient engagement (PHE- model), which features four positions along a continuum of engagement (i.e., blackout; arousal; adhesion; eudaimonic project).

Patients' acceptance of e-health intervention has been assessed through ad hoc questions aimed to assess the live-video interviews with women who have gone through breast cancer experience (pleasantness and usefulness) and meditation experiences (pleasantness, usefulness, and easiness). Each aspect has been assessed through one ad hoc item with 7 response options on a Likert scale. Patients answered these ad hoc question online after each session. The mean value among the ten online sessions has been calculated for each dimension and for each patient.

Table 2. e-health intervention *Con il seno di poi*

SIT phase	Content of the experience
Skills acquisition and rehearsal phase (online sessions 1–7)	The multimedia experience includes seven 25 min sessions to see once a day. Each session includes two parts. In the first one, patients can watch live-video interviews with women who have gone through breast cancer experience, with particular attention to their expectations and emotions, to chemotherapy side effects and to strategies to cope with changes. In the second part, a relaxation and meditation experience is proposed. Specifically, a natural relaxing video is integrated with narrative audio. Exercises are based on muscle progressive relaxation (focusing on legs, arms, abdome, shoulders, face, front, etc.) [24] and breathing. More, the narrative includes Mindfulness inspired strategies [25], such as thought contemplation and detached mindfulness, useful to be aware of one's thoughts and emotions associated with them, and to look at the problem from a different perspective
Application and follow - through phase (sessions 8–10)	The multimedia experience includes three 25 min sessions to see once a day. Also in this case, each session includes two parts. First, video-live of breast cancer patients' interviews currently undergoing chemotherapy treatments - both with and without wigs - are presented. In this way women directly deal with changes due to illness, chemotherapy and related side effects. In addition, suggestions proposed by other patients offer the chance of anticipate possible solutions to problems they will have to cope with. Second, supported by a natural relaxing video integrated with narrative audio, women are encouraged to apply relaxation and meditation strategies acquired in the previous phase sessions

3 Results

3.1 Patients' Engagement

According to the PHE-S, patients can be positioned along a continuum of engagement ranging from the *blackout* phase to the *eudaimonic project* phase. As shown in Table 3, patients maintain a stable position in the *arousal* or *adhesion* phases after two weeks (the duration of the intervention). Specifically, this happens for patients 3 and 4 of the e-health intervention group, while patient 2 evolves from the *blackout* phase to the *arousal* phase and patient 1 comes from the *adhesion* phase back to the *arousal* phase. Patients of the control group maintain a stable position after two weeks, except for patient 6 which evolves from the *blackout* phase to the *arousal* phase.

Table 3. Patients' engagement positions

	e-health group				Control group			
	P1	P2	P3	P4	P5	P6	P7	P8
Baseline	Adhesion	Blackout	Adhesion	Arousal	Arousal	Blackout	Adhesion	Adhesion
After two weeks	Arousal	Arousal	Adhesion	Arousal	Arousal	Arousal	Adhesion	Adhesion

3.2 Patients' Acceptance of the e-health Intervention

The level of patients' acceptance of the e-health intervention (Table 4) comprises patients' evaluation of the two experiences proposed within each online session (interview and meditation) in term of pleasantness, usefulness and easiness. Each dimension is described along a continuum ranging from 1 ("Not at all") to 7 ("Extremely"). Patients 1 and patient 4 reported higher scores of acceptance than patients 2 and 3. In general, all acceptance considered dimensions reached a positive evaluation.

Table 4. Acceptance of e-health intervention

	P1	P2	P3	P4	Total M (SD)
Live-video interview pleasantness	6.67	4.92	4.90	6.25	5.69 (.91)
Live-video interview usefulness	6.84	5.20	4.90	6.18	5.78 (.89)
Meditation pleasantness	6.34	4.67	5.20	6.18	5.60 (.80)
Meditation usefulness	6.59	5.00	4.90	6.18	5.67 (.85)
Meditation easiness	6.84	6.58	6.45	6.07	6.49 (.32)

4 Discussion

This contribution provides the first examination of the effects of an e-health intervention for elderly women undergoing chemotherapy on their engagement and intervention acceptance. Eight women completed the trial, and these primary results are promising.

On the one hand, patients of both groups maintained a stable position about health engagement (mainly ranging from the arousal and the adhesion phases) after two weeks. Even if health engagement appears similar in the two groups, we have to consider that two weeks are a short time to promote patients' engagement. The research is still ongoing and future analyses should include a follow-up evaluation in order to investigate whether the effects of the e-health intervention on patient engagement can be enhanced over time. Furthermore, future research efforts should investigate and define how to design oncology processes of care including e-health intervention that support patient engagement in meaningful ways [27].

On the other hand, patients of the experimental group reported a good level of acceptance of the e-health intervention. Live-video interviews were assessed as useful and pleasant. Meditation experiences were primarily assessed as very easy to be applied and also useful and pleasant. This result appears coherent with other studies showing that brief mindfulness meditation protocols can be successfully integrated in self-help interventions supported by new technologies and mobile apps [28–30].

This study has some limitations that should be highlighted. First, findings are preliminary and results coming from the case series analysis cannot be generalized to a wider population. Data collection from a wider sample is needed to allow statistical comparisons between groups and to confirm the acceptance of the intervention.

Nevertheless, preliminary results suggest that the proposed e-health intervention represents a promising and acceptable approach to prepare elderly women to cope with the stressful experience of chemotherapy.

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