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Effects of web-based instruction and patient preferences on patient-reported outcomes and learning for women with advanced ovarian cancer: A randomized controlled trial

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Abstract

A randomized controlled trial was conducted of a web-based intervention to improve advanced care planning in women with ovarian cancer. A secondary analysis of 35 randomized women focused on changes in distress and knowledge about ovarian cancer through distress monitoring and information tailored to patients' cognitive coping style (monitoring, blunting). Pre/post results indicated the Intervention group demonstrated lower distress ($p=0.06$); blunting was associated with lower depression ($p=0.04$); knowledge in both groups was unchanged. Women in the Intervention vs. Control group reported their family was less likely to be upset by cancer information ($p=0.0004$). This intervention reduced distress while incorporating patient preferences.

Keywords

Ovarian cancer; website; cognitive coping style; patient education; psycho-oncology; distress

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INTRODUCTION

Ovarian cancer is the deadliest of gynecologic cancers¹, with the highest incidence in Europe and Northern America.² It is the fifth leading cause of cancer-death in the United States for women.³ About 70% of ovarian cancers are diagnosed at an advanced stage with less than 30% of women expected to survive 5 years.⁴ Symptoms of the disease vary by individual and often when initially experienced are not attributed to ovarian cancer. This can lead to a delay in diagnosis resulting in more advanced stage of disease at the time of presentation for care. The physical and psychological burden for women and their loved ones is significant as they face the demands of diagnosis, treatment and a pessimistic prognosis. Optimal care includes providing for women's emotional and informational needs.^{5,6}

The sizable psychosocial burden of ovarian cancer has been extensively documented and includes psychological, cognitive, and physical symptoms.⁷ These burdens persist beyond diagnosis and treatment, adding to the importance of behavioral health interventions.⁸ Emotional distress is a significant consequence across cancers,⁹ with 35% to 60% of patients experiencing distress after diagnosis.^{10–12} Given the life expectancy of women with ovarian cancer, distress likely is higher, with as many as 61% to 88% demonstrating distress immediately post-diagnosis.¹³

Psychosocial cancer interventions and the internet

Studies of traditional psychosocial cancer interventions report mixed results, with research based on educational and cognitive behavioral models demonstrating more favorable outcomes.^{14,15} Researchers suggest tailoring cancer information may increase message persuasiveness.⁹ Cancer studies using tailoring, primarily to provide breast cancer risk and screening information, demonstrate increased cancer knowledge and improved risk perception compared to studies using generic information.¹⁶ Tailored information strategies are not theory-specific and represent adapting materials to fit individuals' personal qualities. Both information content and presentation can be tailored for patients.¹⁷

The Internet has an increasing role in healthcare delivery and health information dissemination¹⁸ for both physical and psychological conditions, promoting patient education, communication, psychological care, social support, and behavior change.^{19–22} Web-delivered behavioral health interventions include self-guided programs for physical and mental health conditions and demonstrate improved outcomes compared to non-web-based interventions.²² Social Cognitive Theory (SCT) represents a major theory on which these interventions have been based^{19,23} with cognitive-behavioral techniques (CBT) frequently included (see review²¹). SCT represents a client-centered framework in which individuals' cognitions (e.g., beliefs, attitudes) interact with psychological distress to produce specific responses to health challenges.²⁴ CBT aims at modifying negative attitudes and promoting realistic thoughts and effective coping²⁵ and demonstrates advantages over other therapies, particularly in treating depression and anxiety.²⁶ Cancer patients generally have not been included in controlled studies of web interventions, including those based on SCT and CBT.^{22,23} Available studies have used early/mixed stage cancer patients, and demonstrated improvement on a limited number of symptoms and behaviors, with intervention modalities

mainly based on symptom management, social support and lifestyle change.²⁴ The few web-based cancer studies using distress outcomes are mixed with some reporting positive outcomes while others reporting no change or negative results.^{24,27,28}

Patient-centered cancer care and patient preferences

An important development in cancer care and research, and a National Cancer Institute priority²⁹ is a patient-centered framework, including care based self-management³⁰ and patient-reported preferences. Resulting research emphasizes patients' *decision* preferences^{30,31} with a large body of literature on web-based cancer decision aids.^{32,33} An infrequently studied preference is patients' information-seeking or cognitive coping style (CCS), referring to how individuals select and manage threatening medical health information.^{34,35} Individuals vary in the extent they seek (monitors) and avoid (blunters) such health-related information.³⁶ This is relevant in designing information-based interventions^{34,37,38} because high monitors tend to be less satisfied with information that is provided, have more negative beliefs, and desire both more information and support.³⁸ A few studies in cancer care have explored CCS. For patients with hematological cancers, monitoring was positively and blunting negatively related to a need for information; blunting was negatively related to information satisfaction.³⁹ In an additional study by Rood (2017)⁴⁰ a higher monitoring style was associated with a preference for shared medical decision-making, a need for more information, and dissatisfaction with the information received. Ong (1999)⁴¹ similarly reported a monitoring style for cancer patients was related to a preference for participation in medical decision-making as well as a preference for detailed information. A possible association between CCS and emotional issues has not been included in these studies. However, Schwartz (1995)⁴² reported for unaffected women at increased hereditary ovarian cancer risk, monitoring was associated with intrusive ideation and distress. While none of these studies included an intervention, researchers have speculated about a possible interaction between coping style and a health behavior intervention.

The primary goal of this pilot randomized controlled trial (RCT) was to evaluate the effectiveness of a patient-centered information-based website, named *Together*, designed to promote cancer education, emotional well-being and self-management for women with advanced ovarian cancer.⁴³ Theoretical guidance for development was SCT,¹⁹ specifically attitudes about cancer and learning about cancer, and CBT²⁵ including modifying negative cancer-related attitudes and promoting positive coping. Web-based delivery was selected as providing the best means of individual tailoring.⁴⁴ Information was tailored to information-seeking preferences, i.e., blunters, monitors.⁴⁵ On the basis that tailored information is more helpful than information given as part of usual care, we hypothesized those assigned to the *Together* website (Intervention group) would report greater learning and reduced emotional distress than those assigned to the Control website (usual care materials/PDF format). A secondary goal was to explore the effects of information-seeking preference on distress and attitudes when (health) information education occurs under conditions of high disease threat.

MATERIALS AND METHODS

Subject Recruitment and Data Collection

The results presented here are from a planned analysis of secondary outcomes of a pilot RCT assessing the impact of the *Together* website on advanced care planning.⁴³ Following approval by the University of Minnesota (UMN) Institutional Review Board, women scheduled for a post-operative checkup or planned chemotherapy visit were recruited at the UMN-Fairview Medical Center from September 2012 to February 2013 and followed until May 2013. Participants provided written informed consent, received a study number, and were instructed on website access. Inclusion criteria included newly diagnosed stage III/IV or recurrent (any stage) epithelial ovarian, primary peritoneal or fallopian tube cancer with confirmed pathology; ≥ 18 years old; $\geq 5^{\text{th}}$ grade education; ability to read/write English; and computer/internet access. Demographic and health information included race, age, education, marital status, employment, disease/treatment status. Women with advanced (III/IV) vs. early (I/II) stage diagnosis were selected because 1) the majority of women with ovarian cancer are diagnosed at advanced stages and 2) women with advanced vs. early disease typically differ in QOL levels and psychosocial needs.^{8,46} Therefore, excluding early stage disease patients increased the ability to reliably assess the emotional and cognitive coping responses when the diagnosis is advanced and most likely to be life-threatening.

Assessment was online immediately after study entry (baseline) and within 1 month after the 60-day website access was completed. A prospective, two-arm RCT was conducted. Randomization was 1:1 and blocked by disease phase (newly diagnosed, in remission, first recurrence, multiple recurrences). Randomization was programmed into the website and led participants to their respective website following completion of the baseline survey, thus blinding participants and care providers. Users had 60 days of unlimited access to their assigned website, a duration thought sufficient for learning and practicing stress and distress management skills. They were instructed to use the program at a minimum of 2–3 times per week. Subject retention was enhanced using e-mail and telephone check-ins by the study coordinator and a \$50 gift card mailed after participants completed the follow-up survey.

Psycho-educational Intervention

Development of the *Together* website was based on Social Cognitive Theory⁴⁷ and cognitive behavior therapy²⁵ using iterative qualitative usability testing and UMN medical and psychological providers, web designers, and community stakeholders. Details regarding development of the website are detailed elsewhere.^{43,48} Website components addressing emotional health and cancer knowledge included 1) a Learning Library with distress, coping, and stress management modules designed at three levels permitting users to self-select increasing information complexity; 2) Distress Self-monitoring to promote emotional self-management; and 3) Medical Information. Imbedded in modules were problem-solving, goal-setting, and self-reward tools; opportunities to re-frame negative attitudes and use positive actions; and positive reinforcement. Three informational levels were identified in the Learning Library as *Overview*, *Additional*, and *In-depth* to accommodate monitoring vs. blunting information styles, reflecting preferences for more vs. less information respectively.⁴⁵ Information was tailored to individuals' style due to demonstrated effectiveness in making

health messages more persuasive. Once randomized to the Intervention group, subjects selected their preferred informational level. The Control group accessed usual care materials delivered only as part of this study as PDF files via a separate website. These American Cancer Society materials (www.cancer.org) are available in paper format as part of usual care (www.cancer.org); therefore, both groups received these in paper format.

Measures

Outcome variables

Ovarian cancer knowledge: Ovarian cancer knowledge was assessed using a ten-item true-false scale designed for this study. Items were selected by reviewing *Together* to identify key messages and included four items from a prior study (maximum score = 10).¹³

Psychological distress: Distress was assessed using three measures: the *Hospital Anxiety-Depression Scale* (HADS), *Distress Thermometer* (DT), and *Impact of Events Scale* (IES). These measures have good psychometric properties for cancer patients in general. Their performance within specific cancer populations is less well documented. Thus, three measures were selected to assess negative emotions. Each measure had high internal consistency, test-retest reliability and validity.

The 14-item *Hospital Anxiety-Depression Scale* (HADS) measures anxiety and depression during the prior week.⁴⁹ It contains two subscale scores, Anxiety (HADS-A) and Depression (HADS-D), and a total score. Items were rated on a 4-point scale. Higher scores indicate higher anxiety, depression and distress. In cancer patients a Total HADS score ≥ 15 indicates clinically significant distress.⁵⁰ In this study a score of ≥ 8 indicated mild anxiety or depression on respective subscales.¹¹

The *Distress Thermometer* (DT) is a one-item tool for cancer patients to rate distress [0 (none) to 10 (extreme)].⁵¹ A cut-off of ≥ 4 indicates clinically significant distress (moderate-to-severe)⁶ and yields optimal sensitivity and specificity.^{50,52}

The 15-item *Impact of Events Scale* (IES) assesses cancer-specific distress, in this case stress of an ovarian cancer diagnosis. The IES consists of three scores: Intrusion (range = 0–35) characterized by distracting cancer thoughts/images associated with the diagnosis; Avoidance (range = 0–40) characterized by denial of meanings/results of diagnosis; and a Total score (range = 0–75). Thresholds using Total IES scores represent low (<8.5), medium (9–19), and high (>19) distress.⁵³

Mediating and moderating variables

Learning attitudes: To assess attitudes about learning about ovarian cancer, the 21-item *Cancer Learning Attitudes Scale* was used¹³ which consists of negative and positive attitudes about such learning. Subjects are asked to think about (appraise) the cancer information received and their learning experience, rating their attitudes from 4 (strongly agree) to 1 (strongly disagree) on 11 positive (i.e., benefits of having information and learning about ovarian cancer) and 10 negative items (i.e. risks, fears, disadvantages/reversed scored). Scores range from 21 (least favorable) to 84 (most). Items were based on major concepts in

SCT that have implications for intervention,⁴⁷ and include treatment attitudes, self-efficacy beliefs and coping responses. Learning attitudes represent a broader, more theoretically based appraisal of information benefit compared to satisfaction ratings and are theorized as a mediator between an event (e.g., information use/learning) and its emotional outcome (e.g., distress).⁵⁴ Negative attitudes, which play a fundamental role in CBT, are conceptualized to result in negative emotions.²⁵ This measure has demonstrated sensitivity to changes in levels of distress for ovarian cancer patients with more negative attitudes associated with greater distress.¹³

Cognitive coping style (CCS): The *Threatening Medical Situations Inventory* (TMSI),⁵⁵ used at baseline to identify CCS, measures a tendency to acquire health information under threatening medical conditions. Style differences distinguish individuals from one another and can be considered moderators of stress on coping processes and outcomes.⁵⁶ Preference for information in four hypothetical stressful medical situations (e.g., specialist advises an operation of unknown effectiveness) is assessed; six items for each situation (3 monitoring, 3 blunting) are rated on a 5-point scale indicating the degree each applies from 1 (not at all) to 5 (strongly applicable). Scores on two subscales, monitoring and blunting, range from 15–75; higher scores indicate more monitoring or blunting respectively.

Disease threat—Women rated the seriousness of their disease on a 10-point scale from 0 (low) to 10 (high) to verify they perceived their disease as a serious threat.

Statistical Analysis

Demographic characteristics were summarized and compared by randomization group using Wilcoxon Rank Sum tests for continuous variables and chi-squared and Fisher's exact tests as appropriate for categorical variables. All measures were scored following standard procedures. Missing responses to knowledge questions were deemed incorrect. For all other measures, participants with any missing items for a particular scale were excluded from the analysis of that scale. Correlations between measures at baseline were calculated using Pearson's correlation coefficients. Each measure was assessed for internal consistency using Chronbach's alpha. Analyses focused on comparing changes from baseline to post-intervention (60 days) by intervention group. The differences in change in proportions and means between randomized groups were performed using Fisher's Exact tests and Wilcoxon Rank Sums tests, respectively. Means $\pm$ standard deviations (SD) are presented unless otherwise noted. Data were analyzed using SAS version 9.3 (Cary, NC) and all reported p-values are two-sided; $p < 0.05$ was considered statistically significant.

RESULTS

Of 53 consented subjects, 35 (66.0%) completed the baseline survey and were randomized. Despite follow-up by phone after initial consent, 18 patients did not complete the baseline survey. This was reportedly due to lack of readily available computer access, trouble logging into the website, and being overwhelmed and fatigued by cancer treatment. Women completing the study were younger ($p=0.05$) than those who consented but failed to complete. Of those randomized, 29 (82.8%) participants completed both survey collections.

Patient characteristics at baseline did not vary between randomized groups (Table 1). All women rated the seriousness of their cancer as high (≥ 8 out of 10); most as 10 (65.7%). Most participants were >50 years old, white, married, had some college education and jobs, and were receiving treatment for a recurrence. Means, standard deviations, ranges, Chronbach's alpha, and example items for outcome measures used to assess distress, cancer learning, and CCS are presented in Table 2.

Knowledge

At baseline, all women completing the study correctly answered 8.3 ± 1.6 of 10 questions about ovarian cancer; 11 (31.4%) scored 100%. Pre/post-intervention, there was no difference in Knowledge score between groups (Table 3).

Distress

At baseline, using a score cutoff ≥ 8 for both HADS subscales, 5 (14.7%) of the 34 participants providing complete information for that scale were identified as depressed and 19 (55.9%) as anxious. Using a Total HAD-S score cut-off ≥ 15 , 10 (29.4%) of the 34 subjects were significantly distressed. Using a Total Impact of Event Scale (IES) score cutoff ≥ 20 , 29 women (82.9%) were experiencing high cancer-related distress. At baseline, 22 of the 35 participants (62.9%) were distressed using a cutoff DT score ≥ 4 . A DT cutoff of ≥ 4 'captured' the majority of patients identified as generally distressed (HADS-T; 90.0%) and experiencing cancer-related distress (IES-T; 75.9%). All distress measures were significantly positively and moderately correlated at baseline except for the two highly correlated IES subscales ($r=0.66$, $p<0.0001$), HADS-A and HADS-D ($r=0.58$, $p=0.0003$) and HADS-A with DT ($r=0.53$, $p=0.001$). There was no correlation between distress measures and knowledge; the DT, the IES-TOTAL and the two HADS distress subscales were negatively associated with Learning Attitudes (range: $r=-0.42$ to -0.52 ; $p=0.010$ to 0.001). Pre-post intervention, there were no differences between groups for any distress measure, although those in the Intervention group demonstrated lower general distress as measured by the DT; this difference was, however, not statistically significant (Table 3; $p=0.07$).

Learning attitudes

Attitudes about learning scores changed in a less favorable direction post-use in both arms, albeit non-significantly. In the Control group, 16 of 21 items (76.2%) were answered in a more negative direction post-use; in the Intervention group, 12 of 21 items (57.1%) were answered more negatively. Individual item analysis revealed the 'Information about my cancer upsets my family' item differed pre-to-post testing between groups, with the Intervention group responding in a more favorable direction ($p=0.0004$). At baseline, in addition to being negatively correlated with distress, Learning Attitudes were positively associated with TMSI Monitoring ($r=0.46$, $p=0.01$) but only moderately associated with TMSI Blunting ($r=0.33$, $p=0.06$). Change in Learning Attitudes was not associated with learning style.

Cognitive coping style (CCS)

Within the Intervention group, there was no correlation between CCS and change in distress measures or Attitudes except those with a blunting style were less depressed ($r = -0.51$, $p = 0.04$). At baseline, neither style was associated with any distress measure; monitoring was correlated with Attitudes, that is, those who were more likely to seek information were more likely to have positive attitudes about learning about ovarian cancer.

DISCUSSION

This study provides preliminary estimates for how women with advanced stage ovarian cancer respond to disease information presented by a web-based intervention tailored to their information processing style. Web-delivery was selected intentionally based on its capability to provide cancer-specific tailored information. Before and after using *Together*, small favorable changes were observed for distress and *Together* users were more confident their family members were not upset by their cancer-related information. These results suggest this type of intervention may be used to leverage Web-technology to reduce patients' distress and influence communication with family.

The impact of the *Together* intervention on acquiring information about cancer remains an unanswered question. There is no published standardized questionnaire on ovarian cancer knowledge among women diagnosed with ovarian cancer. The questionnaire selected was originally designed for woman newly diagnosed with ovarian cancer.¹³ Participants' high baseline knowledge scores in this study created a ceiling effect limiting the measurement of possible gains, suggesting it may not be a valid measure for this population. Most women in this study were not newly diagnosed; 80% were in remission, recurrent or had experienced multiple recurrences. This means most had many months-to-years to learn about ovarian cancer. However, this does not mean additional knowledge would be irrelevant for either these long-standing survivors or those with chronic disease. The *Together* website was designed to cover in-depth information across the disease spectrum from diagnosis to hospice care. Unfortunately, our 10-item knowledge questionnaire did not cover this range of in-depth information. Based on our findings, future studies of ovarian cancer knowledge in this population should include items pertinent to the entire disease spectrum.

Given the advantages of tailoring for Web-delivered materials and allowing individuals to opt-in or out of information components likely would guide individualized learning to fill knowledge gaps and maximize learning outcomes. Pre-testing individuals and subsequently directing individuals to material tailored to fill their knowledge gaps also would enhance learning. Participants' preference for the 'amount' of information per topic was tailored but it was beyond the study's scope to tailor topics more individually or to use pre-test scores to direct their learning.

In our study, a significant intervention impact on distress was not demonstrated. In traditional psychosocial intervention studies, the effect on distress is most pronounced in studies of cancer patients who are screened and found to be distressed.⁵⁷ While our patients were distressed, demonstrating high anxiety, cancer-related distress, and depression, a major issue limiting our findings is the small sample size. Other ancillary explanations may be the

intervention's duration and patient coping preferences. Research using individual and group psychosocial interventions that report impacting distress in cancer patients describe a longer intervention length than used in this study.^{14,15,58} Ramadas reviewed web-based diabetes interventions and found longer interventions (more than 12 weeks vs. 8 weeks in this study) resulted in better outcomes. This may be likely for women with ovarian cancer. It remains unclear what intervention duration is for optimal for effectiveness and how to engage users for this length of time. An additional issue limiting our distress findings may be the effect of coping style. In the Intervention group, women could access cancer information in a manner congruent with their preferred learning style. While monitoring was not associated with distress, individuals with a blunting style were less depressed post-Intervention, that is, blunting but not monitoring had a moderating effect on distress. Blunting, characterized by avoiding information, may be protective when learning occurs under conditions of serious health threat. The self-protective aspects of information seeking tend to be neglected in the health literature.^{59,60} In the context of health care, the tendency to avoid or ignore information has been relatively underemphasized in preference to a focus on active seeking and monitoring of information.⁶⁰

Including patients' perceptions, conceptualized as learning attitudes in this study, has been recommended as part of quality cancer care.³⁰ While attitudes were not associated with knowledge or distress outcomes, most in the Control group changed their learning attitudes in a negative direction. In the Intervention group, positive and negative changes were equally divided with one specific attitude significantly changing in a positive direction post-intervention: the majority believed their family was less likely to be upset by cancer information. Learning about cancer may not always be welcomed, but increasingly negative attitudes may be a barrier to continuing to seek or use cancer-related materials. In other words, an individual's increasingly negative attitudes may have a mediating effect, discouraging use. Future studies may confirm this. This study was not designed to measure an association between increasingly negative attitudes and website use for either group. Targeting attitudes known to be *relevant* to individual participants and *directing* them to individually tailored materials to inform (decrease) their negative attitudes may expand usability of web-interventions and ultimately influence outcomes.²²

Beyond the small sample size, possible secondary drawback of duration, and a seemingly too easy knowledge measure, study limitations also include website design issues. First, increasing patients' self-selection of materials based on an initial assessment and automated feedback would expand information tailoring, leverage personal preferences, and enable a closer match of patients' information preferences to management tools.⁶¹ Second, integrating baseline DT results and using a DT score ≥ 4 to screen and identify women with ovarian cancer at greater distress may increase interactivity by providing automated feedback tailored to level of distress. Automated functions have demonstrated effectiveness in web-interventions¹⁹ but were technically beyond the scope of this study. Third, structuring website use differently may be beneficial, such as using incentives to encourage frequency of use over a longer or shorter time period. A certain combination of duration and frequency, as yet undetermined for web-based interventions, may improve compliance and thus outcomes.⁶¹ Finally this web-intervention requires internet access, likely to be less of a

limitation over time. In 2016 it was estimated about 89% of the North America population has an internet connection, 74% of Europe, and 40% world-wide.⁶²

CONCLUSION

Health websites are increasingly being used by patients. While these vary in design, content and intended consumer, web delivery demonstrates many advantages, including standardization, data collection, practical use and saving provider time.^{21,44,63} This study provides insights into designing a psycho-educational website for women with advanced ovarian cancer, a group clearly aware of the seriousness of their disease and distinctly at-risk for high anxiety and cancer-related distress. Such an intervention is not a substitute for face-to-face contact,⁴⁴ but represents an innovative resource to promote cancer-related learning and reduce distress while incorporating patient preferences. Whether delivering cancer information by internet or through more traditional provider-patient encounters, continuing to examine the role of CCS may lead to a better understanding of patients who either seek or avoid information, thereby ultimately improving the delivery of patient-centered communication.

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Baseline demographic and medical data by group. Where data are missing, the total number of subjects used in calculating values is fewer than the 35 randomized.

Table 1.

Variable	Control N=15		Intervention N=20	
	N	%	N	%
Race/Ethnicity				
White, Non-Hispanic	11	78.6	19	100.0
Other	3	21.4	0	0.0
Highest Education				
High School Graduate or Less	1	7.1	6	30.0
Some College	8	57.1	7	35.0
College Graduate/Professional School	8	35.7	7	35.0
Work Outside of Home				
Yes	11	78.6	12	60.0
No	3	21.4	8	40.0
Marital Status				
Single	2	14.3	2	10.0
Married/Partnered	11	78.6	11	55.0
Divorced/Widowed	1	7.1	7	35.0
Disease Status				
Newly Diagnosed	3	20.0	8	40.0
Remission	4	26.7	4	20.0
First Recurrence	5	33.3	6	30.0
Multiply Recurrent	3	20.0	2	10.0
Active Treatment During Study				
Yes	7	46.7	14	70.0
No	8	53.3	6	30.0

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Age at study entry, years, mean±SD	Control N=15		Intervention N=20	
	15		20	
		55.5±8.4		59.6±10.0

Table 2.

Measurement scores at baseline of all participants (n=35).

Measure	N	Mean (SD)	Range	Chronbach's alpha	Example items
Ovarian cancer knowledge (10 items)	35	8.3 (1.6)	4–10	0.57	Once ovarian cancer reoccurs, it is thought of as a chronic disease
DT ¹ (0–10)	35	4.4 (2.7)	0–9	NA	
IES ² -Intrusion	35	15.4 (6.8)	0–33	0.78	Any reminder brought back feelings about ovarian cancer.
IES ² -Avoidance	35	14.4 (8.5)	0–32	0.83	I tried not to talk about it.
IES ² -Total	35	29.8 (14.0)	0–65	0.88	
HADS ³ -Anxiety	34	7.7 (3.4)	0–15	0.75	I feel tense or wound up.
HADS ³ -Depression	34	4.1 (2.9)	1–12	0.82	I look forward with enjoyment to things.
HADS ³ -Total	34	11.8 (5.6)	1–27	0.86	
Learning attitudes	35	63.2 (7.1)	51–79	0.85	I'm scared when I hear facts about ovarian cancer. (negative attitude)
TMSI ⁴ -Monitoring	35	40.8 (8.8)	18–56	0.79	I plan to ask the specialist as many questions as possible.
TMSI ⁴ -Blunting	33	40.5 (7.7)	20–56	0.83	For the time being I try not to think of unpleasant outcomes.
Seriousness (0–10)	35	9.5 (0.7)	8–10	NA	

¹ Distress thermometer

² Impact of Event Scale

³ Hospital Anxiety and Depression Scale

⁴ Threatening Situation Medical Inventory

Outcome measures pre- and post-intervention by intervention group among those who completed the study.

Table 3.

	Pre-intervention				Post-intervention			
	Control		Intervention		Control		Intervention	
Measure	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Ovarian cancer knowledge (10 items)	13	8.9 (1.2)	16	7.8 (1.9)	13	8.8 (0.9)	16	8.3 (1.3)
DT ¹ (0–10)	13	3.6 (2.6)	16	5.3 (2.8)	13	4.4 (2.4)	16	4.1 (2.7)
IES ² -Intrusion	13	15.6 (4.9)	16	15.8 (8.3)	13	15.8 (6.1)	16	14.5 (6.8)
IES ² -Avoidance	13	13.8 (8.1)	16	14.4 (9.5)	13	14.0 (8.8)	16	16.9 (9.1)
IES ² -Total	13	29.4 (11.4)	16	30.1 (16.5)	13	29.8 (14.0)	16	31.4 (12.6)
HADS ³ -Anxiety	12	7.4 (3.1)	16	7.9 (3.3)	13	7.8 (2.7)	16	7.0 (3.6)
HADS ³ -Depression	12	3.7 (2.8)	16	3.9 (2.5)	13	3.2 (2.9)	16	4.9 (3.9)
HADS ³ -Total	12	11.1 (5.1)	16	11.8 (5.0)	13	11.0 (4.3)	16	11.9 (6.9)
Learning attitudes	13	66.2 (6.8)	16	62.4 (7.7)	13	64.0 (6.9)	16	61.4 (7.8)

* Comparison of change in score by intervention group; Wilcoxon Rank Sum test

¹ Distress thermometer

² Impact of Event Scale

³ Hospital Anxiety and Depression Scale