TITLE: VIDEO CONFERENCE vs. FACE-TO-FACE GROUP PSYCHOTHERAPY FOR DISTRESSED CANCER SURVIVORS: A RANDOMIZED CONTROLLED TRIAL

Positive psychotherapy for distressed cancer survivors

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ABSTRACT

Objective: This study assesses the effectiveness of face-to-face group positive psychotherapy for cancer survivors (PPC) compared to its online adaptation, online group positive psychotherapy for cancer survivors (OPPC), which is held via videoconference. A two-arm, pragmatic RCT was conducted to examine the effects of both interventions on emotional distress, posttraumatic stress (PTSS) and posttraumatic growth (PTG) among cancer survivors and analyze attrition to treatment.

Methods: Adult women with a range of cancer diagnoses were invited to participate if they experienced emotional distress at the end of their primary oncological treatment. Emotional distress, PTSS and PTG were assessed at baseline, immediately after treatment and three months after treatment. Intention-to-treat analyses were carried out using general linear mixed models to test the effect of the interventions overtime. Logistic regressions were performed to test differential adherence to treatment and retention to follow-up.

Results: A total of 269 individuals participated. The observed treatment effect was significant in both modalities, PPC and OPPC. Emotional distress (*b*=-2.24, 95%CI=-3.15– -1.33) and PTSS (*b*=-3.25, 95%CI=-4.97– -1.53) decreased significantly over time, and PTG (*b*=3.08, 95%CI=0.38–5.78) increased significantly. Treatment gains were sustained across outcomes and over time. Analyses

revealed no significant differences between modalities of treatment, after adjusting for baseline differences, finding that OPPC is as effective and engaging as PPC.
Conclusions: The OPPC treatment was found to be effective and engaging for female cancer early survivors. These results open the door for psycho-oncology interventions via videoconference, which are likely to lead to greater accessibility and availability of psychotherapy.

Keywords: cancer; oncology; survivors; videoconference; group videoconference; online group psychotherapy; positive psychotherapy; psycho-oncology intervention; e-Health

1. BACKGROUND

Cancer incidence is expected to increase, as is the number of patients who are successfully treated (1). However, higher survival rates do not necessarily imply greater well-being, since several studies show that cancer survivors have more functional limitations, risk of psychosocial problems and emotional suffering, work-related challenges, and fears about their health than non-cancer patients (2,3). All these consequences may lead to poorer quality of life (QoL), less adherence to oncological treatments, lower overall survival, via less adoption of healthy lifestyles and self-care practices when it is not treated (4–6). Although it has been shown that psycho-oncological interventions can improve psychological adjustment, health-related QoL, emotional distress and prevent fear of recurrence (7,8), access is far from universal. In addition to a shortage of psycho-oncologists in national health systems, several factors may limit availability, such as: poor early detection, long waiting times and work, mobility or time restrictions (9).

Manualized psycho-oncological treatments for emotional distress are structured as regular stage-oriented, face-to-face interventions. They typically focus on the initial stages of cancer (i.e., diagnosis and active oncological therapies) (10), palliative advanced phases (11) or extended survivorship after treatment (12). However, few studies have designed and tested specific interventions for early survivorship, at the end of oncological primary interventions and the return to everyday life (13). Indeed, at this transition, chronic and delayed distress trajectories converge in a large number of survivors (30–40%) (14). Consequently, this as a suitable moment to implement psychological treatments (5,8,13). A study on positive psychotherapy for cancer survivors (PPC) (13,15) is one of the few that have analyzed and manualized psychological treatments to facilitate

this transition. PPC is designed to offer accurate, proper psychosocial care combining stress management and emotional regulation (early-stage-oriented(10)) with posttraumatic growth (PTG) facilitation via a meaning-making, existential approach (advanced-stage-oriented (11)).Group PPC proposes that psychosocial treatment in cancer should be tailored and focus on the stress-growth balance (13). Hence, the basic aim of PPC is to facilitate PTG and work on positive resources such as positive emotions, strengths and personal meanings, to reduce emotional distress and posttraumatic stress symptoms (PTSS). The first clinical trial of face-to-face PPC groups vs. treatment as usual and waiting lists showed promising preliminary results for its efficacy to reduce distress (15). Similarly, a recent randomized controlled trial (RCT) (16), which compared PPC groups with cognitive-behavioral stress management groups (10), also demonstrated better PPC results.

Considering the limited access to psycho-oncology services, and the broad availability of health-related resources on the internet (17), online psychosocial treatments are a feasible, acceptable alternative that has the potential to solve some of aforementioned obstacles (17,18). In psycho-oncology settings, treatments are normally focused on patients with high emotional distress and are preferably conducted through synchronous communication, although a wide range of options exists, usually through the adaptation of face-to-face treatments (19,20). Some reviews have highlighted the advantages of online psychosocial resources(17,18), including the possibility of overcoming geographical barriers, avoiding the interpersonal discomfort associated with attending face-to-face settings, or reducing the feeling of being overwhelmed that may be triggered by over-expression or interactions with therapists or other patients. However, disadvantages are also described, such as loss of non-verbal information (21) and high attrition rates (21,22). Attrition has been underlined as a significant methodological problem in assessments of intervention effectiveness. It must be considered in all e-health trials to prevent reduction in their power (21,22). Eysenbach (22) described two types of attrition processes: non-usage attrition (i.e., low adherence), which describes the phenomenon of no longer using the application; and dropout attrition (i.e., loss to follow-up or low retention), which refers to not completing the follow-up measures.

The introduction of psycho-oncological interventions through videoconferences is an example of contemporary solutions in practice, which offers most e-Health advantages while preventing communication limitations, increasing engagement and even reporting slightly greater effectiveness

than face-to-face intervention in outpatient settings (20,23). Videoconferences may not replace personal contact, but they do make synchronous treatment with a clinician possible and enhance verbal and non-verbal communication, almost like face-to-face interventions. In cancer patients, feasibility and acceptance has been proven for individual interventions (24) and pilot videoconference groups are starting to appear (20,25). Despite these promising results, we have not found any randomized clinical trials that compare the effectiveness and specific attrition rates of a synchronous videoconference psycho-oncological group treatment for distress cancer survivors.

This study examines the impact of an online positive psychotherapy in cancer (OPPC) group, held via videoconference, in comparison to its face-to-face PPC group counterpart. This research expands the evidence of positive psychotherapy and e-health psycho-oncology interventions for survivors through a pragmatic RCT to compare the effects of both interventions on distress, PTSS and PTG among cancer survivors. We expect OPPC to be superior in this cancer-stage outpatient survivors sample, given the advantages for videoconference interventions. For example, reducing the feeling of being overwhelmed that may be triggered by over-expression or interactions with therapists and other patients. Second, increasing possibility of overcoming geographical barriers by encouraging access to a highly motivated patients who would not be able to participate in face-to-face intervention and guarantee compliance and recommended psychotherapy dose-effect results. It also analyzes attrition to treatment in terms of dropout attrition and non-usage attrition.

2. METHODS/DESIGN

a. Study design

This pre-registered study (NCT03010371) included two consecutive clinical trials to compare 1) face-to-face PPC vs. stress-management (16), and 2) face-to-face PPC vs. online PPC. The present paper covers the second trial, in which a two-arm, pragmatic RCT was conducted within the routine practice of public health centers. The pragmatic design was chosen for its potential to improve the internal-external validity balance, and its suitability within settings where strict randomization or concealment is not always clinically possible or acceptable (26).

b. Participants

Women with a range of cancer diagnoses were recruited between January 2016 and January 2019. This was due to the high prevalence of high emotional distress between female breast cancer survivors, thus favoring group homogeneity. In order to use the PPC protocol in their validated population and guarantee group homogeneity of the sample, the trial was focused only on female participants. They were referred, in clinical real-life settings and according to routine criteria, by medical oncologists or nurses to the psycho-oncology unit if they presented emotional distress at the end of their primary treatment. The psycho-oncologist carried out a face-to-face interview and patients were asked to answer an online sociodemographic questionnaire and clinical instruments (e.g. HADS administration). If patients met the inclusion criteria, they were invited to participate in the study. Medical information was selected from medical histories with permission. Inclusion criteria were: (a) age ≥ 18 years, (b) primary oncological treatment (i.e., surgery, chemotherapy, radiotherapy) completed, (c) disease-free or clinically stable, (d) ≥10 on the Hospital Anxiety and Depression Scales (HADS) total score, (e) access to high-speed internet and (f) competence to understand and read Spanish. We excluded patients if they (a) reported any current severe mental disorders or (b) any major concurrent medical disease that seriously affected their cognitive performance. Participants were assessed at baseline (T0), immediately after treatment (T1) and three months after treatment (T2). The study was conducted according to the latest version of the Declaration of Helsinki. Approval was given by our hospital's Ethics Committee (PR104/13) and all participants signed an informed consent form.

c. Procedure

Participants were recruited at the healthcare centers of a comprehensive cancer network in Barcelona. Two clinical psychologists, experts in PPC, conducted or supervised the group processes. According to our pragmatic RCT design, which was conducted within the Spanish national health system, we aimed to provide a service to as many users as possible. Therefore, a computer-generated randomization table with random separate allocation was prepared. After assessment, the two modalities were described to the patients and they were encouraged to accept randomization. However, those who showed a strong preference for one of the two options were allocated to their treatment of choice, while all other participants were randomized. This decision entailed some risk of bias, but may control for baseline differences in patient and clinician motivation and outcome

expectations (27). Moreover, it was decided that any between-group difference in sociodemographic or clinical characteristics at baseline would be statistically controlled in the analyses.

Instruments

Psychological distress. HADS (28) measures anxiety and depression in people with physical illnesses, and its overall score may be interpreted as a measure of psychological distress. Costa-Requena, Pérez Martín, Salamero Baró, & Gil Moncayo (29) validated the tool in a Spanish sample of oncology outpatients, with their results showing good reliability (α=.82 and α=.84 for the anxiety and depression subscales, respectively). In our samples, similar internal consistencies were obtained (α=.8479 for the anxiety and α=.824 for the depression scales). A score of 10 or more on HADS total scale resulted useful for screening significant distress in a Spanish sample (29), and a change of ≥2 points has been used as a cut-off point to assess the clinical change (30).

PTSS. The Posttraumatic Stress Disorder Checklist-Civilian Version (PCL-C; 31) is a self-report that covers the diagnostic criteria for posttraumatic stress disorder from the Diagnostic and Statistical Manual of Mental Disorders (32). In the current sample, the total score of the PCL-C was used, which obtained good reliability (α=.90), parallel to the Spanish validation (α=.90) (33) where a recommended cut-off score of 44 is used to detect clinical case (33).

PTG. The Posttraumatic Growth Inventory (PTGI; 34) assesses positive changes experienced after trauma. In this study, the total score was used, showing good reliability (α=.94) similar to that obtained by Costa-Requena, Luis, & Moncayo (35) in the Spanish validation (α=.95).

Treatment integrity. Adherence to the protocol and therapists' competence was assessed with an ad-hoc questionnaire adapted and summarized from the Revised Cognitive Therapy Scale (CTS-R; 36, 37). The ad-hoc questionnaire adaptation is a summary of its more clinically relevant dimensions: agenda (sequence of modules and tasks), conceptual integration, appropriate positive feedback, application of positive change methods and homework tasks.

d. Interventions

Face-to-face group positive psychotherapy for cancer survivorship (PPC)

PPC is a therapist-led group program aimed at facilitating PTG through psychotherapeutic methods associated with the development of positive life changes after cancer. PPC is an evidence-based face-to-face treatment consisting of 12 weekly group sessions of 90–120 minutes. Each group was

comprised of 8–12 patients, and sessions were spread across four modules, each with different lengths and aims (15).

Online group positive psychotherapy for cancer survivorship (OPPC)

OPPC is identical to group PPC in content, but different in its delivery. OPPC is a videoconference psycho-oncological treatment attended through an internet-enabled device from home, consisting of 11 weekly online group sessions of 90–120 minutes. The12th session is conducted in person due to the request of patients participating in pilot OPPC groups and the review of the scientific literature, in which cancer survivors express their need to maintain face-to-face contact at some point during treatment or therapeutic follow-up (17). Participants who could not participate in person during the last session (i.e., individuals who live very far from the hospital), were connected via videoconference to this session. Headsets and webcams were provided when needed.

Participants logged in on a secure platform (ViTAM®), and in collaboration with the University of Girona (UdG), participants could see, hear and interact in real time with all other group members and the therapist simultaneously during the intervention. ViTAM® uses new Web-RTC (real-time communication) technology, which allows direct connection and minimizes delays. Technical support was provided by the UdG. However, given the ViTAM® constraints, the other main difference was group size, with OPPC clusters formed of 5–6 patients. In all cases, the information flows were encrypted to protect confidentiality (38).

e. Data analyses

Baseline differences between participants randomized, and those who preferred allocation to each treatment modality were examined with *chi-squared* and Student's *t* tests. The same analyses were conducted between both therapy groups. In addition, we estimated treatment integrity using the *T* index, which allows the use of ordinal scales. In this case, agreement was defined as identical scores on an item using a7-point scale. Logistic regressions were performed to test differential adherence to treatment and retention to follow-up. Missingness at baseline and variables that differed between groups at baseline were controlled for (i.e., age, education and work status).

Intention-to-treat (ITT) analyses were performed using general linear mixed models (LMMs) to test the effect of interventions (i.e., PPC and OPPC) on distress (HADS total score, and anxiety and depression subscales), post-traumatic stress (PCL-C) and post-traumatic growth (PTGI) overtime (T0, T1 and T2). Little's MCAR test indicated that data were missing completely at random (χ^2[248]

= 207.67, p=.97). Since MCAR can be assumed and since maximum likelihood (ML) was the estimation method, no missing data imputation was applied. Akaike's Information Criterion (AIC) and Likelihood ratio test were used, respectively, in non-nested and nested models, to guide the modeling process. Visual inspection of residual plots did not reveal any obvious deviation from homoscedasticity or normality.

The modeling process began with the most meaningful model close to the null. In the study, this was the unconditional model with time as a linear fixed effect and the intercept as a random effect. Afterwards, time was tested as a random effect. A conditional model with intervention (i.e., PPC and OPPC) as a fixed effect was then tested and finally the interaction of the intervention with time was entered into the model. The final model included random intercepts, and intervention, time and control variables (i.e., age, education and work status) as fixed effects. Covariance structures that best fitted the data were diagonal for level 1, and identity for level 2, as the only significant random effect was the intercept. Pairwise comparisons were conducted between post-intervention and follow-up scores with respect to the baseline, while additional LMMs were run controlling for baseline scores to discard their influence on the results.

For all outcomes, 95% confidence intervals were calculated based on estimates and standard errors. Statistical analyses were performed using IBM SPSS for Windows, Version 24.0(39).

3. RESULTS

a. Participant characteristics

A total of 289 individuals were assessed for eligibility (see the flow diagram in Figure 1). Before domization, 44 participants wanted to be allocated either to the PPC group (n=28) or the OPPC group (n=16), while the 225 remaining individuals were randomized. During the course of the therapy, 54 participants opted out of the study, while 50 opted out at follow-up. A final sample of 269 participants was analyzed. Individuals who accepted randomization, those who preferred PPC and those who opted for OPPC were compared in terms of their social, demographic and clinical characteristics. The only significant difference found between them was age (F=8.78, p<.001), since participants who requested to receive OPPC were clearly younger (M=43.13, SD=8.30) than those who preferred PPC (M=54.04, SD=9.00), with participants accepting randomization falling in-between (M=49.92, SD=8.23). All other features (i.e., civil status, education level, work status,

psychiatric diagnosis, oncological diagnosis, cancer stage) as well as mean scores in the HADS, PCL-C and PTGI did not significantly differ between groups.

Sociodemographic and clinical characteristics at base line of ITT participants in each therapy group finally conformed can be seen in Table 1. Individuals in the PPC and the OPPC groups differed in terms of their mean age again, but also in their education level and work status, and in the mean on the HADS depression subscale and the total scores. In contrast, treatment integrity was similar between interventions, with a mean *T* index of 5.6 for PPC and of 5.7 for OPPC.

----Insert Figure 1.

----Insert Table 1.

b. Treatment attrition

Analyses did not reveal significant differences between interventions in attrition, either for participants' adherence during the intervention (b=-0.517, p=.182, 95%CI=-1.277 - 0.243) or for retention at follow-up (b=*0*.316, p=.143, 95%CI=-0.107 - 0.738).

c. Effect of PPC and OPPC over time

Given the significant baseline differences that were found, the estimated treatment effects of the final LMMs on the dependent variables were adjusted for age, education and work status.

The LMM of the effect of treatment on the HADS total score showed a significant variance in intercepts across participants (Var(u_{0j}) = 32.40, p<.001). Time yielded a significant fixed effect (b=-3.84, p<.001, 95%CI=-3.15– -1.33), which showed an overall decrease in scores between baseline and follow-up (see Figure 2), but no significant fixed effect of therapy (PPC vs. OPPC) was found (b=1.36, p=.163, 95%CI=-0.55 – 3.27).

----Insert Figure 2.

Significant variances in intercepts were also found for the effect of treatment on HADS anxiety (Var(u_{0j})=8.32, p=.003) and HADS depression (Var(u_{0j})=11.69, p<.001), while no significant time-related variation in slopes was found. No significant fixed effect of therapy was found for HADS

anxiety (*b=0*.47, *p*=.387, 95%CI=-0.60 – 1.55) or HADS depression (*b=0*.94, *p*=.09, 95%CI= -0.15 – 2.03), but scores significantly decreased between baseline and follow-up, both for anxiety (*b*=-1.27, *p*< .001, 95%CI=-1.85– -0.69) and depression (*b=0*.93, *p*=.001, 95%CI=-1.46– -0.39). Despite the differences in HADS total and depression scores at baseline, once age, education and work status variables had been controlled, such differences were no longer significant (HADS total, mean difference =-1.35, *p*=.198; HADS depression, mean difference =-.89, *p*=.144). Furthermore, we checked for possible differences between the above results and those from baseline-adjusted models. The same results were obtained, which highlighted the non-significant effect of treatment modality.

The analysis of the effect of treatment on PCL-C showed significant variance in intercepts across participants, Var(u_{0j})=79.75, *p*=.01, but no significant time-related variation in slopes was found. Regarding fixed effects, PCL-C scores significantly decreased between baseline and follow-up (*b*=-3.25, *p*< .001, 95%CI=-4.97– -1.53) (see Figure 2), but no statistical difference between treatments was found (*b*=1.20, *p*=.693, 95%CI=-2.20 – 4.60).

Regarding PTGI (see Figure 2), the LMM testing the effect of treatment yielded significant variance in intercepts across participants, Var(u_{0j})=337.19, *p*<.001, but not in slopes. Once again, the scores significantly improved between baseline and follow-up (*b*=3.08, *p*=.025, 95%CI=0.38–5.78), with the difference between treatments lacking significance (*b*=-0.59, *p*=.841, 95%CI=-6.40 – 5.22).

Table 2 shows the mean differences between baseline and both post-treatment and follow-up scores in all outcomes. Please note that, differently to the LMMs reported above, these values are based on models including interaction between intervention and time to allow the reporting of adjusted estimations, and are only provided for descriptive purposes.

----Insert Table 2.

4. DISCUSION

This study addresses the urgent need to facilitate access to psycho-oncological treatments for distressed cancer survivors, proving the effectiveness of online modalities and users' engagement. To our knowledge, this is the first RCT that provides evidence for the effectiveness of a synchronous

psycho-oncological, therapist-led, videoconference intervention among cancer distressed survivors. The observed treatment effect can be regarded as clinically significant in both modalities, PPC and OPPC. Indeed, LMMs proved that they significantly reduced emotional distress and PTSS, and significantly increased PTG over time. In addition, treatment gains were sustained across outcomes and over time.

In contrast, no significant differences were found between arms, either in attrition, integrity or effectiveness, after adjusting for baseline differences. Similar adherence and retention rates between PPC and OPPC may be related to videoconference therapies led by a recognizable health professional. In this sense, videoconference therapies may show lower attrition than other asynchronous or written synchronous e-health interventions (21,22).

When compared to PPC, it was clear that OPPC was equally efficacious in reducing anxiety, depression, and PTSS. It also facilitated PTG after the results were adjusted for age, education level and work status, although PPC might outperform OPPC immediately after the intervention when interaction is entered into the LMM, as suggested by results on Table 2. These results determine that videoconference stage-oriented OPPC is not superior to PPC. However, it promotes not only distress and stress reduction like other early-stage psycho-oncology interventions (10), but also facilitates positive meaning-making responses such as PTG, in line with findings from previous studies on face-to-face positive psychotherapy for cancer survivors (40). These results are relevant because some studies highlight the need to guarantee access to psycho-oncological treatments for distressed cancer survivors in this critical transition between the end of primary cancer treatments and return to daily life (5,8,13).

Despite the proliferation of online interventions in response to this challenge (18), few studies have focused on the effectiveness of synchronous communication (41). This study moves beyond testing videoconference feasibility, which has already been proven (20,25), and analyzes effectiveness and engagement. The relevant clinical results for OPPC open the door for an exponential increase in the offer of psycho-oncology interventions via videoconference, which is likely to lead to an improvement in psychotherapy accessibility and availability. This new situation is expected to

overcome existing geographical barriers and mobility limitations, and to provide an alternative to avoid the interpersonal discomfort that may be felt in face-to-face settings (17,18).

a. Study limitations

Results from this RCT should be interpreted cautiously since, as a pragmatic RCT, there are some limitations that need to be considered. The respect for patient treatment preferences may have partly biased the results, although it also brings them closer to real-world clinical practice. This study does not include a non-treatment control group because we focused on comparing treatment delivery modalities. However, this intervention has been compared to a waiting list control group in a previous study (15) and to other evidence-based interventions (16) with better results. Differences found between-group at baseline were statistically controlled in the analyses. Other limitations were the difference in the number of individuals in each group, as there were 10–12 patients in PPC and 5–6 in OPPC groups. These differences may affect the results as group sizes, not just modality, could influence group evolution, alliance or commitment.

b. Clinical implications

This study supports OPPC, which was found to be an efficacious psycho-oncological treatment for female cancer survivors. Our promising results should encourage the extension and adaptation of OPPC to men, mixed groups, adolescents or young adults, especially considering the significantly younger age of those participants who requested to receive OPPC in our study. Furthermore, future research may also focus on describing online group factors (42), or whether combined face-to-face and online modes are more suitable and effective (43).

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Data availability statement. The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Table 1. Baseline sociodemographic and clinical characteristics of participants

	PPC	OPPC	Statistics		
	(*n*= 145)	(*n*= 124)	*t*	X^2	*p*
Age *M* (*SD*)	52.17 (8.36)	47.34 (8.05)	4.80		<.001
Civil status *n (%)*				2.58	.630
Single	7 (4.8)	9 (7.3)			
Married	102 (70.3)	89 (71.8)			
Divorced/Separated	25 (17.2)	19 (15.3)			
Widow	9 (6.2)	7 (5.6)			
Unknown	2 (1.4)	0 (0.0)			
Education *n (%)*				16.39	.001
Primary	49 (33.8)	29 (23.4)			
Secondary	57 (39.3)	52 (41.9)			
Tertiary	27 (18.6)	42 (33.9)			
Unknown	12 (8.3)	1 (0.8)			
Work status *n (%)*				22.76	<.001
Passive	16 (11)	8 (6.5)			
Active	11 (7.6)	24 (19.4)			
Retired	24 (16.6)	22 (17.7)			
Occupational disability	7 (4.8)	18 (14.5)			
Work leave	73 (50.3)	49 (39.5)			
Unknown	14 (9.7)	3 (2.4)			
Psychiatric diagnosis *n (%)*				2.25	.324
Yes	115 (79.3)	89 (71.8)			
No	26 (17.9)	29 (23.4)			
Unknown	4 (2.8)	6 (4.8)			
Oncological diagnosis *n (%)*				0.87	.648
Breast	118 (81.4)	101 (81.5)			
Others	26 (17.9)	23 (18.5)			
Unknown	1 (0.7)	0 (0.0)			
Stage *n (%)*				8.24	.221
0	10 (6.9)	3 (2.4)			
I	55 (37.9)	38 (30.6)			
II	41 (28.3)	53 (42.7)			
III	26 (17.9)	19 (15.3)			
IV	7 (4.8)	5 (4.0)			
N/A	1 (0.7)	1 (0.8)			
Unknown	5 (3.4)	5 (4.0)			
HADS *M* (*SD*)					
Total	21.21 (7.26)	19.23 (7.31)	2.00		.047
Anxiety	12.36 (4.10)	11.59 (4.06)	1.35		.178
Depression	9.06 (4.25)	7.67 (4.38)	2.26		.025
PCL-C*M* (*SD*)	53.33 (12.95)	52.02 (12.81)	0.75		.454

PTGI *M* (*SD*)	50.04 (21.26)	52.32 (23.66)	-0.74	.459

Note. PPC = Positive Psychotherapy for Cancer; OPPC = Online Positive Psychotherapy for Cancer; HADS = Hospital Anxiety and Depression Scales; PCL-C = Posttraumatic Stress Disorder Checklist-Civilian version; PTGI = Posttraumatic Growth Inventory

Figure 1. Consolidated standards of reporting trials (CONSORT) diagram.

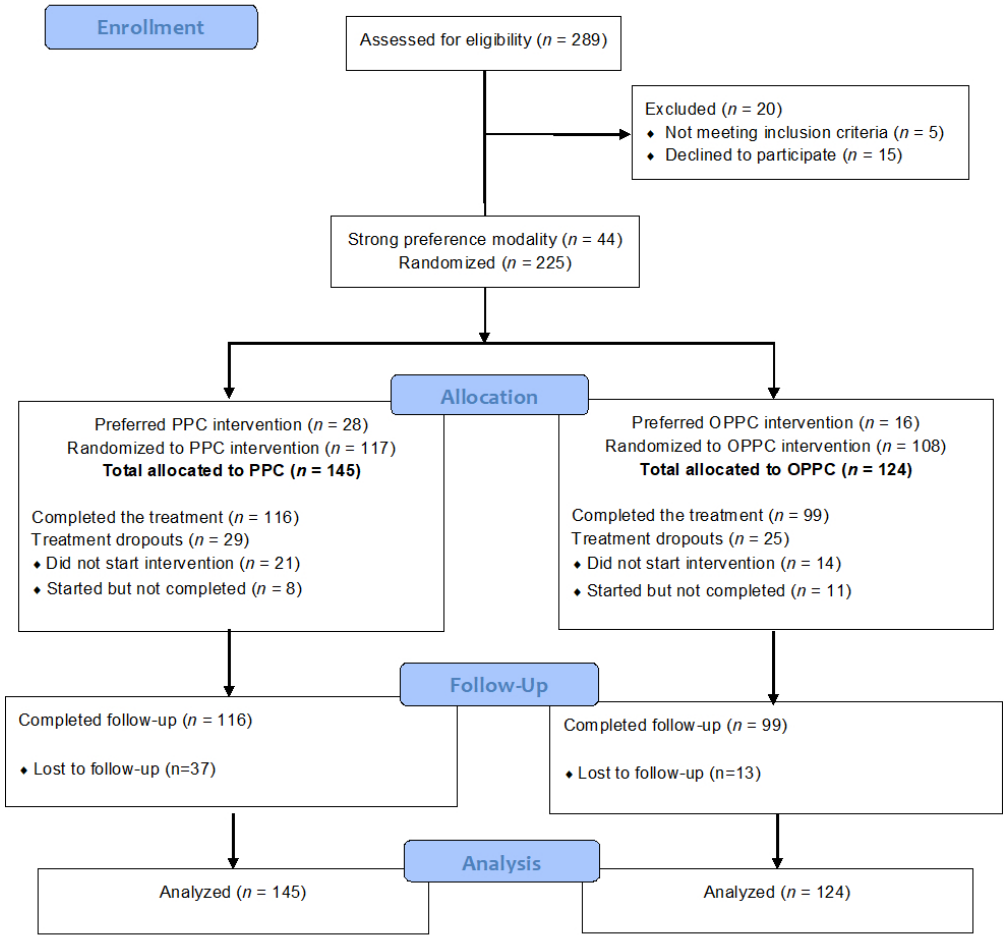
Figure 2. HADS total, PCL-C, and PTGI score means for PPC and OPPC at T0, T1 and T2.

Table 2. Mean differences (95%CI) at post-treatment and follow-up with respect to baseline scores in all outcomes measured

	Post-treatment				3-month follow-up			
	PPC	*p*	OPPC	*p*	PPC	*p*	OPPC	*p*
HADS total	-0.75 (-1.84 – 0.34)	.178	-1.57 (-2.61 – -0.53)	.003	-2.58 (-3.90 – -1.26)	<.001	-1.97 (-3.22 – -0.72)	.002
Anxiety	-0.45 (-1.14 – 0.20)	.170	-0.88 (-1.52 – -0.24)	.007	-1.32 (-2.17 – -0.47)	.002	-1.23 (-2.02 – -0.43)	.003
Depression	-0.21 (-0.93 – 0.52)	.573	-0.71 (-1.40 – -0.02)	.042	-1.12 (-1.91 – -0.33)	.006	-0.78 (-1.51 – -0.05)	.035
PCL-C	-0.55 (-2.52 – 1.41)	.579	-2.18 (-4.06 – -0.30)	.023	-2.60 (-5.10 – -0.10)	.042	-3.87 (-6.23 – -1.51)	.001
PTGI	5.35 (1.75 – 8.94)	.004	2.03 (-1.36 – 5.43)	.239	3.31 (-0.65 – 7.26)	.101	2.82 (-0.87 – 6.51)	.133

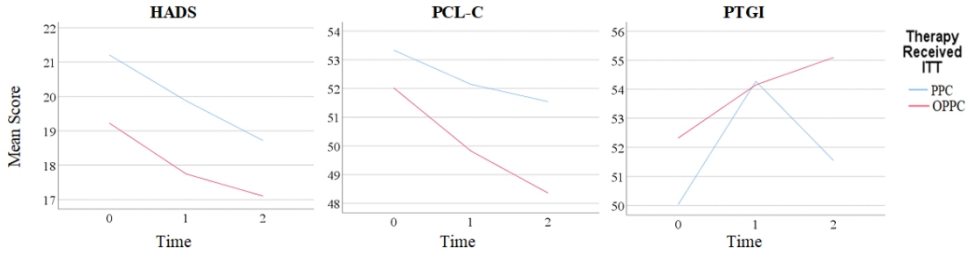
Note. PPC = Positive Psychotherapy for Cancer; OPPC = Online Positive Psychotherapy for Cancer; HADS = Hospital Anxiety and Depression Scales; PCL-C = Posttraumatic Stress Disorder Checklist-Civilian version; PTGI = Posttraumatic Growth Inventory

Figure 1. Consolidated standards of reporting trials (CONSORT) diagram.



Note. PPC = Positive Psychotherapy for Cancer; OPPC = Online Positive Psychotherapy for Cancer

Figure 2. HADS total, PCL-C, and PTGI score means for PPC and OPPC at T0, T1 and T2



Note. PPC = Positive Psychotherapy for Cancer; OPPC = Online Positive Psychotherapy for Cancer; HADS = Hospital Anxiety and Depression Scales; PCL-C = Posttraumatic Stress Disorder Checklist-Civilian version; PTGI = Posttraumatic Growth Inventory; T0=baseline, T1=immediately after treatment; T2=three months after treatment