



Effects of a Psychosocial Skills Training Package on Optimism in Patients with Breast and Colon Cancer: A Quasi-Experimental Study

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Abstract

Background and Objective: Cancer diagnosis poses significant psychological challenges, often diminishing patients' optimism, a key predictor of treatment adherence and quality of life. While psychological interventions have shown promising results in improving optimism among cancer patients, most studies have focused on single-component approaches (e.g., cognitive restructuring or social support alone). Theoretical frameworks such as the biopsychosocial model suggest that integrating both psychological and social skills may yield more comprehensive benefits; however, this integrative approach remains underexplored in Iranian psycho-oncology settings. Therefore, the present study aimed to examine the effects of a researcher-developed psychosocial skills training package on optimism in patients with breast and colon cancer.

Materials and Methods: This quasi-experimental study employed a pre-test/post-test design with a control group and two-month follow-up. Thirty patients with breast and colon cancer and low optimism scores (<15) were recruited via purposive sampling based on eligibility criteria; then, randomly allocated to experimental or control groups ($n=15$ each) using block randomization. The experimental group received an eight-session, researcher-developed psychosocial skills training package (45 min/session), while controls received usual care. Optimism was measured using the Scheier & Carver's Life Orientation Test. Data were analyzed using mixed repeated-measures ANOVA in SPSS software (version 27).

Results: The mixed repeated-measures ANOVA revealed a significant Group $\times$ Time interaction effect for optimism after Greenhouse-Geisser correction: $F(1.644, 41.1) = 14.996, p < 0.001$, partial $\eta^2 = 0.28$. According to Cohen's conventions, this represents a large effect size, indicating that the psychosocial skills training package substantially improved optimism in the experimental group relative to controls.

Conclusions: The psychosocial skills training package demonstrated a statistically significant and large effect on optimism in patients with breast and colon cancer. However, given the pilot nature of this quasi-experimental study with a small, single-site sample, these findings should be interpreted as preliminary evidence. Future large-scale randomized controlled trials are needed to confirm efficacy and establish clinical guidelines before broader implementation can be recommended.

Keywords: Breast Neoplasms, Colonic Neoplasms, Optimism, Psychosocial Intervention

Background

Cancer is a highly complex genetic, epigenetic, and environmental disease with a high degree of variability at the tissue, tumor, and cellular levels, which can lead to challenging treatment trajectories [1, 2]. Epidemiological estimates indicate that approximately one out of five individuals will develop cancer during their lifetime [3]. Among various types of cancer, breast cancer is the most prevalent malignancy in women and a leading cause of cancer-related mortality in both developed and developing countries [4, 5]. Recent studies have

revealed increasing trends in breast cancer incidence in regions, including the Western Pacific [6] and Iran [7, 8]. Similarly, colon cancer represents a major global health burden as the fourth leading cause of cancer-related mortality worldwide [9]. Although colon cancer is prevalent in both genders, it is more common in men than in women [10], with incidence rising with age and peaking in individuals aged 75 years and older [11].

Beyond its physical impact, cancer diagnosis constitutes a profound psychological challenge that

may severely affect patients' quality of life, manifesting as sleep disturbance, depression, anxiety, and fatigue [12-14]. Among psychological constructs affected by cancer, optimism—a dispositional tendency to expect positive outcomes—has emerged as a key predictor of treatment adherence, coping effectiveness, and overall well-being [15, 16]. Optimistic individuals typically employ adaptive coping strategies, view challenges as manageable, and maintain hope despite adversity, which may buffer against cancer-related distress [16].

Research consistently demonstrates that optimism declines following cancer diagnosis in both breast and colon cancer populations [17, 19]. However, it is important to note that these prior studies have primarily employed observational or correlational designs, documenting associations between optimism and outcomes without testing whether optimism can be actively improved through intervention. While psychological interventions have shown efficacy in improving optimism among cancer patients [20, 21], most studies have focused on single-component approaches targeting either cognitive or emotional domains. However, cancer-related distress is inherently multidimensional, encompassing cognitive, emotional, behavioral, and social challenges that may require integrated psychosocial approaches.

The biopsychosocial model provides a theoretical framework for understanding how psychological and social factors interact to influence health outcomes in chronic illness. This model suggests that interventions addressing both intrapersonal processes (e.g., acceptance and self-compassion) and interpersonal skills (e.g., communication and boundary-setting) may yield more comprehensive benefits than unidimensional approaches. Regarding the inclusion of both breast and colon cancer patients, these populations share common psychosocial challenges, including uncertainty about prognosis, treatment-related side effects, and disruptions to social roles despite differences in disease-specific experiences. Focusing on the shared psychological outcome (optimism) rather than cancer type allows examination of Tran's diagnostic mechanisms of change, which aligns with contemporary approaches in psycho-oncology.

Nevertheless, the simultaneous analysis of the effects of psychosocial intervention on optimism among cancer patients has been less explored, and the gap observed in this respect lies in the fact that most studies have investigated psychological

intervention exclusively in relation to optimism, whereas social health intervention has been largely neglected. Accordingly, given the issues outlined above, this study sought to determine whether a psychosocial skills-based intervention influences optimism in cancer patients. We hypothesized that participants receiving the psychosocial skills training package would demonstrate significantly greater improvements in optimism scores from pre-test to post-test and follow-up compared to controls.

Objectives

The present study aimed to examine the effects of a researcher-developed psychosocial skills training package on optimism in patients with breast and colon cancer.

Materials and Methods

Study Design and Participants

This quasi-experimental study employed a pre-test/post-test design with a control group and a two-month follow-up. The study was conducted in the oncology ward (outpatient, inpatient, and surgery units) of Imam Hospital in Sari, Iran, from January to March 2024.

A total of 30 patients with breast and colon cancer and an optimism score below 15 (cut-off point of Scheier & Carver scale) were enrolled. Participants were recruited via purposive sampling based on predefined eligibility criteria: [1] diagnosis of breast and colon cancer, [2] optimism score < 15, [3] minimum high school education, [4] no prior participation in psychosocial skills training, and [5] provision of written informed consent. Exclusion criteria included: presence of chronic physical or psychological comorbidities (assessed via medical records and clinical interview), use of psychiatric medications, concurrent psychotherapy, absence from more than two intervention sessions, or voluntary withdrawal from the study.

Sample Size and Sampling Method

The study was designed as a pilot randomized controlled trial, with the primary objectives of assessing the feasibility and acceptability of the intervention, evaluating the procedures for participant recruitment and retention, and obtaining preliminary estimates of the intervention effect and its variability to inform the design and sample size calculation of a future definitive randomized controlled trial. Accordingly, a formal power calculation based on hypothesis testing of the primary efficacy outcome was not performed. Instead, the sample size was determined based on established recommendations for pilot and feasibility studies, which indicate that a total sample

of approximately 30 participants can provide useful preliminary estimates of effect sizes, variability, recruitment and retention rates, and other parameters required for planning a subsequent adequately powered trial [22]. Therefore, 30 eligible participants were recruited and allocated equally to the experimental and control groups (15 participants per group). [22].

Data Collection

Optimism: The Scheier & Carver Life Orientation Test (1985) was used to assess optimism. The revised 10-item version employs a 5-point Likert scale (0=strongly disagree to 4=strongly agree), with items 3, 7, and 9 reverse-scored. Total scores range from 0 to 30, with a cut-off point of 15 distinguishing low versus high optimism. Although the scale has a bidimensional structure (optimism and pessimism subscales), consistent with the validated Persian version and clinical screening protocols in Iranian psycho-oncology settings, the total score was used as the primary outcome indicator [23]. Cronbach's alpha for the present sample was measured at 0.81. Although the scale has a bidimensional structure, consistent with the validated Persian version and clinical screening protocols in Iranian psycho-oncology settings, the **total score** was used as the primary outcome indicator to identify patients with low overall optimism (cut-off<15).

Procedure

After obtaining ethical approval [Ethics Code: IR.IAU.ARDABIL.REC.1403.160] and necessary permissions from Ardabil Azad University and Imam Hospital, eligible patients were identified through medical records and invited to participate in the study. Following informed consent and baseline assessment (pre-test), participants were randomly assigned to groups. The intervention was delivered by the first author (a Ph.D. candidate in psychology with supervised clinical experience in psycho-oncology) in the hospital's oncology ward. Post-test assessments were administered immediately after the intervention, and follow-up assessments were conducted two months later. The control group received usual care throughout the study period.

Intervention Program

The experimental group received eight sessions of a researcher-developed psychosocial skills training package (45 min/session), while the control group received usual care. The protocol was designed based on a comprehensive review of psycho-oncology literature and the specific needs of Iranian cancer patients, integrating evidence-based techniques targeting both psychological well-being (e.g., acceptance and self-compassion) and social functioning (e.g., communication skills and boundary-setting). Session content, goals, and operational tasks are detailed in Table 1.

Table 1. Outline of the Researcher-Developed Psychosocial Skills Training Package

Session	Goal	Content	Task (Operational Definition)
1st	Initial acceptance of the current situation without judgment; reducing efforts to control uncontrollable aspects of illness. (<i>Reconnecting with personal narrative</i>)	Introduction & Anchoring: Overview of the "Dynamic Health" concept.	Task 1: Guided practice of naming and accepting present emotions without attempting to change them. Group Discussion: "What is the biggest uncertainty you are facing right now?"
2nd	Clarifying core personal values that the patient wishes to maintain during treatment (e.g., relationships, creativity, and calmness). (<i>Building self-management capacity</i>)	Values Exploration Exercise.	Task 2: Identifying and extracting 3 main personal values under crisis conditions. Training: Discussing how these values can align with medical recommendations. Practical Exercise: Drawing a personal "Values Map".
3rd	Enhancing ability to clearly express emotional and practical needs to family and friends. (<i>Structuring social support</i>)	The Art of Effective Asking: Communication skills training.	Task 3: Practicing the "Verbal Buffer" technique to limit draining or intrusive conversations. Role-Play: Simulating requests for specific support from a hypothetical person (e.g., spouse or child). Task 4: Exercises on returning to past roles (e.g., "What would you do today if you were a friend, not a patient?").
4th	Identifying and reactivating pre-diagnosis roles and identities beyond the "patient" label. (<i>Reconnecting with personal narrative</i>)	Beyond the Patient Label: Identity exploration.	Group Discussion: Exploring inner barriers to retrieving pre-illness identities.
5th	Reducing fatigue-induced self-criticism, guilt, and distress related to treatment side effects. (<i>Building self-management capacity</i>)	Self-Compassion Practice.	Task 5: Tangible self-compassion exercises (e.g., soothing touch, reciting encouraging statements). Group Work: Externalizing and constructively challenging the "inner critic".
6th	Reducing stress from undesirable social interactions and maintaining healthy personal boundaries. (<i>Structuring social support</i>)	Contact & Boundary Management.	Task 6: Designing personalized communication scripts for challenging social situations (e.g., unwanted visits, intrusive questions). Focus: Strategies for preserving social energy and emotional reserves.
7th	Increasing self-confidence in communication with the medical team; reducing anxiety related to medical terminology. (<i>Ensuring continuity of self-care</i>)	Data Mastery & Self-Advocacy.	Task 7: Structuring questions before medical visits using a 5-item checklist. Exercise: Translating complex medical terms into practical, everyday language.

8th	Consolidating gains and preparing for future treatment phases; promoting adherence to self-care guidelines. (<i>Cycle completion & sustainability</i>)	Active Resilience Program.	Task 8: Reviewing and integrating all learned skills. Designing a "Personal Transition Plan" for post-training phases. Commitment Exercise: Planning one small, values-based action to maintain psychological health
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Note. This Table outlines the researcher-developed psychosocial skills training package. Sessions were designed based on a needs assessment of cancer patients and integrate evidence-based techniques targeting both psychological well-being and social functioning.

Intervention Fidelity and Adherence Monitoring

Therapist qualifications, treatment fidelity procedures, and participant adherence monitoring are reported in accordance with methodological standards (see Response to Comment 7 for details). Briefly: a session-specific checklist ensured protocol adherence, attendance was recorded, and participants missing > 2 sessions were excluded from analysis. All 15 experimental participants attended ≥ 6 sessions ($M=7.2$, $SD=0.8$).

Data Analysis

Descriptive statistics (frequencies, means, and SDs) summarized demographic and clinical characteristics. Between-group baseline comparability was assessed using Chi-square tests for categorical variables and independent t-tests for continuous variables. To test the primary hypothesis regarding intervention effects on optimism over time, a 2 (Group: experimental vs. control) $\times$ 3 (Time: pre-test, post-test, follow-up) mixed repeated-measures ANOVA was conducted. The Group $\times$ Time interaction effect was the primary test of intervention efficacy. Assumptions of normality (Shapiro-Wilk), sphericity (Mauchly's test), and homogeneity of variance (Levene's test) were examined. Where sphericity was violated (Mauchly's, $p < 0.05$), Greenhouse-Geisser corrected values were reported. Effect sizes were calculated using partial eta-squared (η^2), interpreted according to Cohen's conventions (small=0.01,

medium=0.06, and large=0.14). Bonferroni-adjusted post hoc comparisons were conducted for significant interactions. All analyses were performed using SPSS (version) with $\alpha = 0.05$.

Ethical Considerations

This study reports optimism-related outcomes from a larger approved research project (Ethics Code: IR.IAU.ARDABIL.REC.1403.160), titled "Designing a model for teaching mental and social health skills and measuring its effectiveness on optimism, medication adherence, social relationships and social support of patients." The original ethics approval explicitly covers all endpoints of the parent project, including the optimism measure analyzed herein. Written informed consent was obtained from all participants, and confidentiality was maintained throughout the study.

Results

A total of 30 (15 per group) patients participated in the study. As shown in Table 2, no significant differences were observed between the intervention and control groups in terms of demographic variables (gender, education, and age) or clinical characteristics (cancer type, cancer stage, and treatment type), all $P > 0.05$, indicating successful balancing through randomization.

Table 2. Baseline Demographic and Clinical Characteristics of Participants (n=30)

Variable	Category	Intervention Group (n=15)	Control Group (n=15)	P-value
Gender	Male	7 (46.7%)	4 (26.7%)	0.67*
	Female	8 (53.3%)	11 (73.3%)	
Education	Diploma	8 (53.3%)	7 (46.7%)	0.96*
	Bachelor's degree	5 (33.3%)	5 (33.3%)	
	Other/Higher	2 (13.4%)	3 (20.0%)	
Age (years), Mean $\pm$ SD	—	49.22 $\pm$ 5.86	49.15 $\pm$ 5.44	0.41**
Cancer Type	Breast	9 (60.0%)	8 (53.3%)	0.53*
	Colon	6 (40.0%)	7 (46.7%)	
Cancer Stage	Stage I–II	8 (53.3%)	7 (46.7%)	0.82
	Stage III–IV	7 (46.7%)	8 (53.3%)	
Current Treatment Type	Chemotherapy	10 (66.7%)	9 (60.0%)	0.75*
	Radiation Therapy	5 (33.3%)	6 (40.0%)	

Note. Values are presented as n(%) unless otherwise indicated.

*Chi-squared test

**Independent t-test

Table 3 presents the mean and standard deviation of optimism scores across the three measurement points (pre-test, post-test, and follow-up) for both groups. The experimental group showed a notable increase in mean optimism scores from pre-test

($M=10.17$, $SD=3.25$) to post-test ($M=13.81$, $SD=4.84$), which was largely maintained at follow-up ($M=13.22$, $SD=4.87$). In contrast, the control group showed minimal change across time points.

Table 3. Distribution of descriptive indicators of optimism variable in study groups

Variable			Pre-test		Post-test		Follow-up		Sig. **
			Mean	SD	Mean	SD	Mean	SD	
Optimism	Optimism	Test	10.17	3.25	13.81	4.84	13.22	4.87	0.01
		Control	10.19	3.28	10.91	4.75	9.33	4.22	0.749
	Sig.*		0.895		0.001		0.001		
	Pessimism	Test	13.71	3.27	10.18	4.25	10.22	4.27	0.001
		Control	13.95	3.28	13.11	4.75	12.19	4.80	0.567
	Sig.		0.652		0.001		0.001		

*Non-parametric Mann-Whitney test

**Non-parametric Kruskal-Wallis test

To test the primary hypothesis regarding intervention effects on optimism over time, a 2 (Group) $\times$ 3 (Time) mixed repeated-measures ANOVA was conducted. Before analysis, assumptions were examined: normality (Shapiro-Wilk, all $p > 0.05$), homogeneity of variance (Levene's test, all $p > 0.05$), and sphericity (Mauchly's test, $p = 0.011$). Since sphericity was violated, Greenhouse-Geisser corrected values ($\epsilon = 0.822$) were reported.

The analysis revealed a significant Group $\times$ Time interaction effect for optimism: $F(1.644, 41.1) = 14.996$, $p < 0.001$, partial $\eta^2 = 0.28$. According to Cohen's conventions, this represents a large effect size, indicating that changes in optimism over time differed substantially between groups. The main effect of Time was also significant, $F(1.644, 41.1) = 34.574$, $p < 0.001$, partial $\eta^2 = 0.476$, while the main effect of Group was not significant, $F(1, 28) = 0.12$, $p = 0.73$. (Table 4).

Table 4. Test of within-subjects test effects for analyzing the effect of psychosocial skills on optimism

Reference			Sum of squares	Degree of freedom	Mean squares	F	Sig.	η^2
Optimism	Time	Assumption of sphericity	101.600	2	50.800	34.574	0.001	0.476
		Greenhouse-Geisser	101.600	1.644	61.805	34.574	0.001	0.476
		...	101.600	1.754	57.937	34.574	0.001	0.476
		Lower boundary	101.600	1.00	101.600	34.574	0.001	0.476
	Time-group interaction	Assumption of sphericity	44.067	2	22.033	14.996	0.001	0.283
		Greenhouse-Geisser	44.067	1.644	26.807	14.996	0.001	0.283
		...	44.067	1.754	25.129	14.996	0.001	0.283
		Lower boundary	44.067	1.00	44.067	14.996	0.001	0.283
	Error	Assumption of sphericity	111.667					
		Greenhouse-Geisser	111.667					
		...	111.667	66.638	1.676			
		Lower boundary	111.667	38.00	2.939			
		...	188.867	61.143	3.089			
		Lower boundary	188.867	38.00	4.970			

Bonferroni-adjusted pairwise comparisons (Table 5) indicated that within the experimental group, optimism scores significantly increased from pre-test to post-test (mean difference = 3.45, $p < 0.001$) and from pre-test to follow-up (mean

difference = 2.90, $p = 0.002$). The difference between post-test and follow-up was not significant ($p = 0.38$), suggesting stability of gains. No significant within-group changes were observed in the control group at any time point (all $p > 0.05$).

Table 5. Results of Bonferroni post hoc test for pairwise comparisons of groups' means in optimism variable

Variable	Measurement time	Experimental group		Control group	
		Mean difference	SD	Mean difference	SD
Optimism	Pre-test/post-test	3.45*	0.32	0.55	0.33
	Pre-test/follow-up	2.90*	0.42	0.90	0.49
	Post-test/follow-up	0.55	0.35	0.39	0.32

*Significance < 0.05

Discussion

The present study aimed to investigate the effectiveness of a psychosocial skills-based program on optimism in cancer patients. The findings indicated that the psychosocial skills training package significantly improved optimism scores among patients with breast and colon cancer

compared to controls. While the statistical effect size was large (partial $\eta^2 = 0.28$), the clinical relevance of these findings should be interpreted cautiously given the pilot nature of this study, including the small sample size, heterogeneous cancer types, and single-site design.

These results align with prior research

demonstrating that psychological and psychosocial interventions can positively influence optimism and related outcomes in cancer populations [24-30]. However, it is important to note that the cited studies employed diverse methodologies and intervention components; the present study extends this literature by testing a researcher-developed, multi-component psychosocial skills package specifically designed for Iranian cancer patients.

Regarding potential mechanisms of change, while the present study did not directly measure mediating processes, several theoretical pathways may help explain the observed improvements. One possible explanation is that skills targeting emotional acceptance and values clarification may have reduced experiential avoidance, potentially freeing cognitive and emotional resources for hopeful future-oriented thinking. Additionally, training in communication and boundary-setting may have enhanced perceived social support, a known buffer against cancer-related distress. However, as these mechanisms were not empirically assessed in the present study, such explanations remain hypothetical and warrant further investigation in future research that incorporates process measures.

Strengths and Limitations

This study has several strengths, including the development of a needs-based, culturally adapted psychosocial skills package, the use of a controlled quasi-experimental design with follow-up, and the application of rigorous statistical methods. However, key limitations must be acknowledged. First, the small sample size ($n=30$) limits statistical power and precision of effect estimates. Second, the inclusion of two cancer types without stratification may introduce heterogeneity in treatment experiences and psychological responses. Third, the single-site recruitment limits external validity to other clinical settings. Fourth, the researcher's dual role as interventionist and evaluator introduces potential bias. These limitations underscore the preliminary nature of our findings.

Implications for Future Research

Rather than recommending immediate clinical implementation, we emphasize that these findings generate hypotheses and effect size estimates to inform the design of future, more rigorous trials. Priority directions include: [1] replication in larger, multi-site randomized controlled trials, [2] investigation of mediating mechanisms through process measures, and [3] assessment of longer-term outcomes to evaluate sustainability of gains.

Conclusion

The present study provides preliminary evidence

that a researcher-developed psychosocial skills training package can produce statistically significant improvements in optimism among patients with breast and colon cancer. These findings suggest that integrating acceptance-based strategies, communication skills, and self-compassion practices may offer a feasible approach to supporting psychological well-being during cancer treatment.

However, given the exploratory nature of this pilot study, including the small sample size ($n=30$), single-site recruitment, heterogeneous cancer types, and lack of an active control group, these results should be interpreted with caution. The clinical relevance of the observed changes, while promising, requires further validation through standardized benchmarks (e.g., minimal clinically important difference) in larger, definitive trials.

Rather than recommending immediate clinical implementation, we emphasize that these findings generate hypotheses and effect size estimates to inform the design of future, more rigorous randomized controlled trials. Priority directions include: [1] replication in multi-site samples with stratification by cancer type and stage, [2] investigation of mediating mechanisms through process measures, and [3] assessment of longer-term outcomes to evaluate sustainability of gains.

Ethical Considerations

This article with the Ethics Code (IR.IAU.ARDABIL.REC.1403.160), has been derived from a student thesis in psychology at Ardabil Azad University of Psychology. The provided Ethics Code [(IR.IAU.ARDABIL.REC.1403.160)] belongs to the approved parent project: "Designing a model for teaching mental and social health skills and measuring its effectiveness on optimism, medication adherence, social relationships and social support of patients". This manuscript reports one component (optimism outcomes) of that larger Ph.D. dissertation. The original ethics approval explicitly covers all study endpoints, including optimism.

Sponsorship

This research is in the form of a Ph.D. dissertation and has received no financial support.

Author Contributions

This work was extracted from the first author's Ph.D. dissertation, was guided by the second and third authors, and was advised by the fourth and fifth authors.

Conflicts of Interest

All authors declared that there were no conflicts of interest to report.

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