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A Self-Care Empowerment Program to Improve Life Satisfaction in Breast Cancer Patients Receiving Chemotherapy: An Experimental Study

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Abstract

Background and Aim: Breast cancer and its treatments can significantly impair the psychological well-being and life satisfaction of patients. This study aims to examine the effect of a structured self-care empowerment program on the life satisfaction of women with breast cancer undergoing chemotherapy.

Material and Methods: This experimental study was conducted in 2023 on 88 women with breast cancer undergoing chemotherapy in two hospitals in Alborz province, Iran. The intervention group participated in four 60-minute group training sessions based on the empowerment model of Anderson and Funnell. The life satisfaction of women was measured using the Satisfaction with Life Scale (SWLS) at baseline and two weeks post-intervention. Data were analyzed using paired and independent t-tests, with effect size estimation.

Results: The baseline demographic and clinical characteristics were comparable between the groups before the intervention. The mean score of life satisfaction in the intervention group increased from 19.97 ± 6.41 to 21.59 ± 6.15 after the intervention, showing a significant difference in this regard ($p = 0.001$). However, no significant changes were observed in the mean score of life satisfaction in the control group ($p = 0.128$). Inter-group differences in the mean score of life satisfaction were statistically significant after the intervention ($p = 0.04$), with a moderate effect size (Cohen's $d = 0.44$).

Conclusion: The self-care empowerment program effectively enhanced life satisfaction among women undergoing chemotherapy for breast cancer. Given its simplicity, low cost, and feasibility, integration of this program into routine oncology nursing care is recommended to support psychological well-being and improve quality of life (QoL) of breast cancer patients.

Keywords: Empowerment, self-care, life satisfaction, chemotherapy, breast cancer, clinical trial.

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Introduction

Breast cancer has remained the most prevalent cancer among women worldwide over the years. It has been reported that breast cancer and lung cancer were the leading cancers among women and men, respectively, in both incidence and mortality [1].

In 2022, approximately 2.3 million newly diagnosed cases of breast cancer and 670000 related deaths were reported among women worldwide. In some countries, the global burden of breast cancer by 2025 is projected to grow by 38% in new cases and 68% by deaths [2].

In Iran, research has projected a 63% increase in breast cancer incidence among women by 2025, with the number of diagnosed patients expected to reach 25,013 cases, indicating a significant upward trend [3].
Breast cancer is a multifaceted and complex disease characterized by the abnormal proliferation of cells. Approximately 10% of all breast cancer cases are attributed to hereditary autosomal dominant genetic mutations [4]. While being female is the primary risk factor, men can also be affected by breast cancer, with women being about 100 times more likely than men to develop this cancer [5]. Additionally, some studies have reported a link between oxidative stress and breast cancer risk, as well as the potential protective role of antioxidants [6].

Treatment strategies vary depending on disease stage and typically include surgery, radiotherapy, and systemic treatments such as hormonal therapy, chemotherapy, targeted therapy, or a combination of these approaches [7-8].

Chemotherapy, before or after surgery and radiotherapy, can often be used to shrink tumors, prevent recurrence, and inhibit the spread of breast cancer [9].

Common side effects of chemotherapy include infections, anemia,

thrombocytopenia, fatigue, nausea, vomiting, hair loss, diarrhea, and constipation [6,10]. Depression, concentration problems, pain, mucosal changes, skin lesions, and peripheral neuropathy are among the most frequently reported chemotherapy-related complaints [11].

Women with breast cancer, especially those undergoing chemotherapy, face significant physical and emotional challenges [12]. They experience various stressors that significantly impact their QoL and life satisfaction. Life satisfaction, as a dimension of QoL, is increasingly recognized as a key indicator of overall health [13]. Poor life satisfaction is associated with adverse health outcomes, including a higher risk of chronic illness and mortality [14]. According to Diener et al. (1999), life satisfaction reflects a subjective judgment of one's life, comparing expectations with actual achievements [15]. Several studies have shown that life satisfaction reflects one's evaluation of his/her life as an ideal, and is influenced by age, education level, employment status, perceived health, and social support [16-17]. One study reported that younger age, comorbidities, and reconstructive surgery are associated with poorer body image and lower life satisfaction, while access to multiple treatment options and strong social support are linked to greater satisfaction in physical, disease-related, and social domains [18]

Coping mechanisms play a critical role in the physical and psychological well-being and adaptation of patients with chronic physical conditions, such as cancer [19]. One of the most essential coping strategies in such patients is self-care, a method used for managing life challenges and stressors that promotes health, independence, and symptom relief [20]. Various studies have demonstrated the effectiveness of self-care empowerment in promoting satisfaction with life in patients with different chronic diseases or in people at different periods of

life [21-22]. Evidence has revealed that self-care education can significantly improve the physical and psychological well-being of patients with cancer [23-24].

This study was informed by self-regulation theory, which posits that individuals' ability to cope effectively with an experience is strongly influenced by how well they are prepared for it [25]. Moreover, promoting self-care ability through targeted interventions is essential, given the chronic nature of cancer and the side effects of treatments, which can negatively impact patients' life satisfaction [26-27]. Empowerment is a process that facilitates behavioral and lifestyle changes by increasing self-awareness, enhancing disease knowledge, and fostering active patient participation in disease management [28]. According to Anderson and Funnell, empowerment programs are structured and planned interventions designed to facilitate behavioral self-management and help individuals set realistic, meaningful, and achievable goals [29]. These programs typically include five steps; identifying the problem, clarifying its meaning and associated emotions, setting long-term goals, designing and implementing a plan, and evaluating outcomes [30-31]. Using the Satisfaction with Life Scale (SWLS), another study found that cancer survivors had significantly lower life satisfaction scores compared to individuals without cancer [32].

Self-care empowerment programs encourage active patient participation, improve self-efficacy, reduce distress, and enhance emotional well-being and life satisfaction. Such interventions also strengthen treatment adherence and continuity of care [34-35]. Therefore, assessing the effect of a self-care empowerment program on the life satisfaction of cancer patients is essential for improving holistic, patient-centered care.

Self-care empowerment appears to be a promising strategy to improve patients' QoL and satisfaction with life, considering

the high prevalence of breast cancer globally [36]. Given the lack of studies directly addressing this issue, the present study was conducted to investigate the effect of a self-care empowerment program on the life satisfaction of patients with breast cancer undergoing chemotherapy.

Methods

This experimental study was conducted on 88 patients with breast cancer undergoing chemotherapy in the oncology wards of hospitals located in Alborz province, Iran.

The inclusion criteria were limited to the age of 18-65 years, basic literacy, absence of diagnosed psychological disorders, and no prior formal education in medical sciences. Missing more than one of the four planned training sessions, death, or transfer to another hospital were considered as exclusion criteria.

To determine the minimum required sample size at a 95% confidence level, 80% test power, and a precision of 4 for examining the effect of intervention on life satisfaction, the sample size per group was calculated using the following formula:

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2 \times (s_1^2 + s_2^2)}{d^2}$$

The sample size per group was estimated to be approximately 39 participants. However, considering a 10% attrition rate, the final sample size was estimated to be 44 participants per group.

Informed consent was obtained from 88 eligible patients enrolled in both the control and intervention groups.

Participants were recruited from two hospitals (44 from each one). Random allocation to the intervention or control group was performed using block randomization stratified by hospital to ensure a balanced group size within each site. Separate randomization lists were generated for each hospital using four permuted blocks (two participants allocated to the intervention group and two to the control group in each block). The randomization sequence was generated by

an independent researcher using a computer-based random number generator, and group assignments were concealed in sequentially numbered, opaque sealed envelopes until enrollment.

The intervention group received a structured self-care empowerment program consisting of four 60-minute training sessions conducted biweekly, aligned with patients' chemotherapy schedules. Sessions were held in small groups (4 participants) using a lecture-discussion format accompanied by a tailored educational booklet. A panel of subject matter experts evaluated the educational booklet for content validity, relevance, clarity, scientific accuracy, and cultural appropriateness. The booklet was distributed among the participants in the intervention group at the end of the first session.

Session arrangements were coordinated in a secure private room. Weekly follow-ups via phone calls were maintained by the third author from the beginning of the program until two weeks after its completion, with scheduled call times shared by SMS. Two weeks after the intervention, follow-up questionnaires were completed again in both groups. The intervention was based on Anderson and Funnell's empowerment model, which includes the stages of problem identification, emotional exploration, goal setting, planning, implementation, and evaluation [25] (Table 1).

Table 1. Content of Empowerment Program Sessions

Session	Educational Content	Duration
1st	- Introduction of the researcher, explanation of the study objectives, and obtaining informed consent from participants. - Discussion of patients' emotions, thoughts, and beliefs regarding breast cancer and chemotherapy to identify problems and educational needs. - Identification of five major concerns expressed by patients that can be addressed through nursing educational interventions, including disease definition, physical and psychological complications, chemotherapy side effects, impact on life aspects, medication regimen, non-pharmacological management, nutrition, sleep disturbances, activity level, sexual function, support systems, and procedural uncertainties (e.g., vital signs monitoring, infection prevention). - Patients' emotional expression regarding the identified issues (Step 1 and 2). - Based on the identified needs, an educational booklet was designed and provided to participants. Explanation of its content, empowerment goals, and relevance to improving disease management and QoL was provided (Step 3).	60 minutes
2nd	- Education began with the nature of breast cancer, risk factors, and complications, as well as the necessity of chemotherapy in order to enhance disease threat perception. - Guidance on lifestyle adjustments suitable for patients, including physical activity, rest, sexual and social functioning, mental health, coping with hair loss, fatigue, pain, and maintaining oral health was provided. - The last 15 minutes were dedicated to answering participants' questions (Step 4).	60 minutes
3rd	- Educational program continued with the focus on practical procedures such as port care, monitoring vital signs, correct medication use, infection prevention, dietary recommendations, and management of nausea/vomiting, gastrointestinal complications, and cardiovascular health. - 15 minutes were dedicated to question and answer (Q&A) and overall review of the content (Step 4). - The booklet was reread, and participant engagement was encouraged to boost motivation. Weaknesses were identified and addressed (Step 4).	60 minutes
4th	- Last session was held to evaluate participants' efforts and the effectiveness of the empowerment program. - Summary of content and resolution of educational gaps were provided. - Appreciation and acknowledgment of participant contributions were observed, and gifts were presented as a token of gratitude (Step 5).	60 minutes

Measurement tools included a demographic information form and SWLS. The SWLS, developed by Diener et al. (1985), consists of five items on a 7-point Likert scale (from 1 = strongly disagree to 7 = strongly agree). The total score of this tool ranges from 5 to

35, with higher scores indicating greater life satisfaction.

In this scale, life satisfaction is categorized into seven levels, from "extremely dissatisfied" to "extremely satisfied" [37-39]. This scale has demonstrated strong internal consistency (Cronbach's alpha ranging from 0.82 to 0.87 across different studies [40]. Cerezo et al. (2022) conducted a psychometric evaluation of 222 Spanish women with breast cancer and reported a McDonald's omega of 0.80 [41]. Nooripour et al. (2023) validated the Persian version of the SWLS among women with breast cancer. Confirmatory factor analysis supported a single-factor model with good fit indices, with Cronbach's alpha of 0.84 [42]. Data were analyzed using SPSS software version 21. All participants were fully informed about the study objectives. Written informed consent was obtained from the patients. Additionally, a condensed four-session empowerment program was offered to the control group upon completion of the study to ensure ethical fairness.

This study was conducted in accordance with ethical standards and received approval from the Ethics Committee of Islamic Azad University of Medical Sciences, Tehran (Ethics Code: IR.IAU.TMU.REC.1402.096).

Results

Most patients in both groups belonged to the 40-49-year age group. The majority of participants in both groups were married. Most participants in both groups had an education level of below diploma (50% in the intervention group and 45.5% in the control group). The majority of participants in both groups were housewives (88.6% in the intervention group and 75% in the control group). Half of the patients in the intervention group (50%) and the control group (52.3%) had not undergone breast surgery before chemotherapy. Among those who had undergone surgery, total mastectomy was the most common type of

surgery in the intervention group (15.9%), whereas lumpectomy was the most common type in the control group (25%).

A total of 88 patients completed the study. Table 2 shows the demographic characteristics of the participants. No significant differences were found between the two groups, indicating that they were demographically homogeneous (Table 2).

Table 2. Baseline Demographic Characteristics of Participants in the Intervention and Control Groups

Characteristic	**Category**	**Intervention Group** */Frequency (Percent)*	**Control Group** *Frequency (Percent)*	**Statistical Test**
Age (years)	< 40 40–49 50–59 ≥ 60 Total Mean ± SD Below Diploma	5 (11.4) 16 (36.4) 11 (25) 12 (27.3) 44 (100) 50.13 ± 9.94 22 (50)	13 (29.5) 14 (31.8) 11 (25) 6 (13.6) 44 (100) 47.9 ± 9.77 20 (45.5)	*t = 1.327 df = 86 p = 0.188
Education Level	High School Diploma Associate Degree Bachelor's Degree Master's Degree Total	14 (31.8) 2 (4.5) 4 (9.1) 2 (4.5) 44 (100)	11 (25.0) 4 (9.1) 7 (15.9) 2 (4.5) 44 (100)	** p = 0.765
Employment Status	Not employed *(homemaker)* Employed (Private Sector) Employed (Government) Retired Total	39 (88.6) 4 (9.1) 0 (0.0) 1 (2.3) 44 (100)	33 (75/0) 7 (15.9) 3 (6.8) 1 (2.3) 44 (100)	** p = 0.253
Cancer Grade	Grade 1 Grade 2 Grade 3 Total	19 (43.2) 21 (47.7) 4 (9.1) 44 (100)	20 (45.5) 23 (52.3) 1 (2.3) 44 (100)	**p = 0.481

Cancer Stage	Stage1 Stage 2 Stage 3 Total	14 (31.8) 21 (47.7) 9 (20.5) 44 (100)	15 (34.1) 25 (56.8) 4 (9.1) 44 (100)	**p = 0.161
History of Breast Surgery Prior to Chemotherapy	Yes No Total	22 (50.0) 22 (50.0) 44 (100)	21(47.7) 23 (52.3) 44 (100)	χ^2 = 0.046 df = 1 p = 0.831
Type of Breast Surgery	None Total Mastectomy Radical Lumpectomy Total	7 (15.9) 6 (13.6) 4 (9.1) 5 (11.4) 44 (100)	3 (6.8) 5 (11.4) 2 (4.5) 11 (25.0) 44 (100)	** p = 0.339

***In depended t-test **Exact Fisher' test

The independent t-test showed no statistically significant difference between the two groups at baseline in satisfaction with life (t = 0.41, df = 86, p = 0.683).

Paired t-test indicated a statistically significant difference in the mean scores of life satisfaction before and after the intervention in the intervention group (p = 0.001).

The mean score of life satisfaction slightly decreased from 19.45 ± 5.51 at baseline to 19.13 ± 4.83 at the end of the study in the control group, and the paired t-test revealed no statistically significant difference between the two time points (p = 0.128) (Table 3).

Table 3. Mean and Standard Deviation of Life Satisfaction Scores among Participants in the Intervention and Control Groups (Before and After the Empowerment Program)

Life Satisfaction Level	Intervention Group		Control Group	
	Before intervention	After intervention	T1	T2
	Frequency (Percent)	*Frequency (Percent)*	*Frequency (Percent)*	*Frequency (Percent)*
Very Dissatisfied (Scores 5–9)	2 (4.5)	0 (0.0)	1 (2.3)	0 (0.0)
Dissatisfied (Scores 10–14)	9 (20.5)	4 (9.1)	7 (15.9)	8 (18.2)
Slightly Dissatisfied (Scores 15–19)	10 (22.7)	14 (31.8)	16 (36.4)	20 (45.5)
Neutral (Score 20)	4 (9.1)	2 (4.5)	4 (9.1)	1(2.3)
Slightly Satisfied (Scores 21–25)	11(25/0)	14 (31.8)	10 (22.7)	10 (22.7)
Satisfied (Scores 26–30)	6(13.5)	6 (13.6)	4 (9.1)	4 (9.1)
Very Satisfied (Scores 31–35)	2(4.5)	4 (9.1)	2 (4.5)	1(2.3)
Total	44(100)	44 (100)	44 (100)	44 (100)
Mean ± SD	19.6 ± 97.41	21.6± 59.15	19.45 ± 5.51	19.13 ± 4.83
Min–Max	5-33	11-35	8-33	10-32
Test results	t= 3.719 df = 43 p=0.001		t= 1.552 df=43 p=0.128	

*Paired t-test

The independent t-test revealed a statistically significant difference between the two groups in that regard (t = 2.086, df = 86, p = 0.04), with a Cohen's d effect size of 0.44, indicating a moderate effect of the empowerment program (Table 4).

Table 4. Mean and Standard Deviation of Life Satisfaction Scores in the Intervention and Control Groups Before and After the Empowerment Program

Life Satisfaction / Groups (Phases)	Value (Mean ± SD)	Paired t-test Statistic	df	p-value	Cohen's d (95% CI)
Intervention (before intervention)	19.97 ± 6.41	0.41	86	0.683	0.44 (95% CI: 0.02 to 0.86)
Control (T1)	19.45 ± 5.51				
Intervention (after intervention)	21.59 ± 6.15	2.086	86	*0.04	
Control (T2)	19.13 ± 4.83				

*Cohen's d effect size: Small = 0.20, Medium = 0.50, Large = 0.80

To control the potential baseline differences and obtain a more accurate estimate of the intervention effect, an analysis of covariance (ANCOVA) was performed with post-intervention life satisfaction as the dependent variable, group (intervention vs. control) as the fixed factor, and baseline life satisfaction as the covariate. The preliminary evaluations confirmed that the assumptions of normality, linearity, homogeneity of variances, and homogeneity of regression slopes, have been met.

After controlling for baseline scores, the results revealed a statistically significant difference between the two groups in terms of post-intervention life satisfaction score, *(F* (1, 85) = 4.32, p = 0.041, partial η^2 = 0.048). The adjusted mean score of life satisfaction was higher in the intervention group (21.48 ± 0.92) than in the control group (19.24 ± 0.92), indicating that the self-care empowerment program had a moderate and meaningful effect on improving life satisfaction among breast cancer patients receiving chemotherapy (Table 5).

Table 5. Results of ANCOVA for Comparing Post-Intervention Life Satisfaction Scores between the Intervention and Control Groups, Controlling for Baseline Life Satisfaction

Source of Variation	SS	df	MS	F	p-value	Partial η^2	Adjusted Mean ± SE
Group (Intervention vs. Control)	160.52	1	160.52	4.32	0.041	0.048	Intervention: 21.48 ± 0.92 Control: 19.24 ± 0.92
Baseline Life Satisfaction (Covariate)	1124.33	1	1124.33	30.26	< 0.001	0.261	_
Error	3324.19	85	39.11	_	_	_	_
Total	_	87	_	_	_	_	_

Note. ANCOVA was conducted with post-intervention life satisfaction as the dependent variable, group as the independent variable, and baseline life satisfaction as the covariate. After adjusting for baseline scores, the intervention group showed significantly higher life satisfaction compared with the control group ($p < 0.05$).

Discussion

This study was conducted to determine the effect of an empowerment program on the life satisfaction of women with breast cancer undergoing chemotherapy. The present study demonstrated that the empowerment program significantly improved life satisfaction among patients with breast cancer in the intervention group. Our results are consistent with previous studies that underscore the beneficial effects of empowerment-based interventions on psychological well-being and QoL among patients with breast cancer [43-44], confirming the clinical relevance of such programs as complementary to conventional cancer treatments.

The present findings are consistent with those of Ilie et al. (2024), who reported that a cancer patient empowerment program (a comprehensive home-based intervention including physical exercise, nutritional education, and social support) significantly reduced psychological distress and improved emotional well-being in cancer survivors, including breast cancer patients [45]. Since improved emotional well-being is closely linked to higher life satisfaction, their results support our findings that indicate self-care empowerment can significantly enhance life satisfaction among women receiving chemotherapy.

In addition, a study revealed a notable positive relationship between empowerment and adherence to medication among patients with breast cancer undergoing anti-hormonal therapy, and highlighted the key role of psychological factors, especially patient empowerment, in improving medical adherence [46].

In this study, the intervention was conducted in person within groups of four participants. This approach aligns with previous research that indicated participation in peer support groups

enhances patient empowerment by offering emotional support, facilitating information exchange, and fostering a sense of community. These experiences help patients feel more informed, accepted, and confident in managing their illness, ultimately promoting self-care, healthier lifestyles, greater life satisfaction, and improved QoL [47-50].

A study reported that the EMPOWER-SMS program produced minor improvements in medication adherence [51]. Given that the effect size in the present study was moderate, the observed difference may be attributed to the greater effectiveness of the empowerment program, which was delivered in-person and within the small group setting, an approach that may have enhanced participant engagement and intervention impact.

The lack of significant improvement in the control group supports the hypothesis that standard care alone may not be sufficient to address the complex psychosocial challenges faced by breast cancer patients. Based on a review study, complementary and alternative medicine can be helpful in this regard [52].

In a study titled: “Effect of Empowerment Program on Life Satisfaction in Patients with Coronary Artery Disease,” a statistically significant difference was observed in the life satisfaction scores in the intervention group before and after the intervention [53], which aligns with the findings of the present study.

The present study faced certain limitations. Participants' psychological states, such as fatigue, anxiety, and irritability at the time of completing the questionnaires may have influenced their responses. To mitigate these effects, appropriate conditions and timing were considered, and additional time was allowed for the completion of questionnaires. Future research is warranted to explore alternative educational approaches.

Conclusion

Findings of the present study indicated that the implementation of a self-care empowerment program positively influenced life satisfaction among patients with breast cancer undergoing chemotherapy. The empowerment program, which encompassed educational sessions, group discussions, distribution of informational booklets, and use of participants' feedback during the training, effectively enhanced the life satisfaction of patients. Cancer and chemotherapy, along with their associated side effects and limitations, adversely affect QoL of patients. Consequently, educational interventions aimed at increasing patients' awareness and enabling them to use available resources are critically important. Such interventions may reduce patients' excessive reliance on healthcare services stemming from insufficient knowledge and perceived lack of control over treatment-related side effects. This empowerment program could be integrated into routine nursing care and clinical practice to support patients undergoing chemotherapy, given its simplicity, efficacy, and feasibility within a structured implementation framework. Therefore, incorporating empowerment-based education into patient care protocols is strongly recommended.

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Conflict of Interests

The authors declare no conflicts of interest related to this study.

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