



## Effect of Health Literacy Intervention on Self-Efficacy and Symptoms Distress among Older Women with Breast Cancer Undergoing Chemotherapy

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### Abstract

**Background:** Health literacy skills are critical since they influence how older adults recognize their health issues; manage their symptoms and engage in successful coping with their cancer. **Purpose:** This study aimed to evaluate the effect of health literacy intervention on self-efficacy and symptoms distress among older women with breast cancer undergoing chemotherapy. **Design& Setting:** This randomized control trial study was conducted during 2022-2023 in the oncology day clinic at Zagazig University Hospitals. **Sample:** The study sample composed of 100 older breast cancer patients undergoing chemotherapy, randomly assigned into two groups. The study group (n=50) received six sessions every two weeks and the control group (n=50) received no intervention. **Tools:** Four tools were used; interview questionnaire, All Aspects of Health Literacy Scale, the Cancer Behavior Inventory-Brief Version, and the Memorial Symptom Assessment Scale Short Form. **Data Analysis:** Chi-square test, independent samples t-test, paired t-test, Pearson correlation, and linear regressions were used for data analysis. **Results:** The study findings showed statistically significant improvements in the study group's health literacy, self-efficacy, and lowering symptoms distress compared to the control group ( $p < .01$ ). Also, total health literacy score of the study group after the intervention positively correlated to self-efficacy score ( $r = 0.501$ ) and symptom distress score was negatively correlated to total health literacy score ( $r = -0.478$ ) and self-efficacy score ( $r = -0.562$ ). **Conclusion:** Health literacy intervention was effective and could be used to enhance patients' health literacy and self-efficacy, and decrease symptoms distress in older women with breast cancer undergoing chemotherapy.

**Keywords:** Health Literacy, Self-Efficacy, Symptoms Distress, Older Women, Breast Cancer

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### Introduction

Globally, breast cancer is the most common malignancy diagnosed among women and more than half are diagnosed beyond the age of 60 years. Life

expectancy is increasing and new cases of breast cancer diagnosed among older women are likely to rise as well (Siegel et al., 2021). In Egypt, the most common cancer in women is breast cancer,

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representing 38.8% of all cancer types in this population, with over 22,700 cases expected in 2020 and anticipated to be around 46,000 in 2050. The breast cancer mortality rate is approximately 11%, making it the second leading cause of cancer-related death after hepatocellular carcinoma (Alorabi & El-Ghazawy, 2021).

Chemotherapy is the main treatment for breast cancer; however, it is accompanied by significant side effects. Hair loss, mouth sores, anorexia or weight changes, nausea and vomiting, diarrhea, fatigue, and nerve damage are some of the most significant side effects can (American Cancer society, 2021). These side effects negatively affect physical and psychological wellbeing of the older women with breast cancer (Iddrisu et al., 2020). Older adults especially vulnerable for a high symptom distress and their symptoms tend to impact their ongoing treatments, cause longer hospital stays, and an even earlier death (Mandelblatt et al., 2020). Recently symptom assessment became based on evaluating total symptom distress instead of assessing only individual symptoms (Fjell et al., 2020).

Older woman with breast cancer usually struggles with both the traumatic effect of the cancer diagnosis and different side effects caused by the cancer therapy. A woman's capability to adapt to cancer and its treatment is enhanced by self-efficacy (Arikan et al., 2020). So, improving self-efficacy levels in women with breast cancer empowers them in symptom management and in the control of side effects (Baik et al., 2020).

Older patients with cancer are expected to understand complicated information about their diagnosis, symptoms, and management. So, Health literacy is integral to this. Today, health literacy is seen as a worldwide goal that achieved by enhancing education and communication strategies to improve health outcomes (Parker & Ratzan, 2019). Low health literacy in older adults is associated with poor medication and treatment adherences, lack of confidence in health management, and high mortality rate (Smith, 2022). So, health literacy skills are critical since they influence how older adults recognize their health issues; manage their symptoms and engage in successful coping with their cancer (Samoil et al., 2021). Therefore, this study aimed to evaluate the effect of health literacy intervention on self-efficacy and symptoms distress among older women with breast cancer undergoing chemotherapy.

## **Method**

### ***Study Design and Setting***

A randomized control trial design was used to conduct the current study from June 2022 up to the end of March 2023 in the oncology day clinic at Zagazig University Hospitals, Egypt. The oncology day clinic is an outpatient clinic specified to provide chemotherapy treatment to cancer patients.

### ***Sample***

The sample of this study included 100 older women (50 patients in study group & 50 patients in control group) with breast cancer undergoing chemotherapy who fulfilled the following criteria; agree

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to participate in the study and able to communicate. Patients with stage IV breast cancer were excluded. The enrolled patients were randomly allocated in a 1:1 ratio to the study or control group. Study group received the health literacy intervention while the control group received only routine hospital care.

## **Sample size calculation**

EPI Info software program version 6.04 was used to calculate the sample size. According to hospital records; the total population of older women with breast cancer undergoing chemotherapy is 600 through the year and based on the percent of improvement in a previous study which was 30% (Kim et al., 2019) with a power of 80% and at confidence level 95%, therefore the sample was 100 patients (50 patients in study group & 50 patients in control group).

## **Tool of data collection**

Four tools were used for collection of data. **Tool I:** an interview questionnaire to assess older women's characteristics which included age, residence, marital status, educational level, monthly income, living condition, stage at diagnosis, and number of chemotherapy cycles.

**Tool II: All Aspects of Health Literacy Scale (AAHLS)** (Chinn & McCarthy, 2013):

The AAHLS is a validated questionnaire consisted of 13 questions covering four domains that assess functional, communicative, critical, and empowerment health literacy. The scale based on foundational health literacy designed by Nutbeam to test different skills of health literacy. Patients must

choose from three options 'Rarely, Sometimes or often' for eleven questions, with scores ranging from 1 to 3 points, depending on whether the question has positive or negative intent. Two questions are 'Yes/No' answers with a score of 1 for 'Yes' and 3 for 'No'. The total AAHLS score is obtained by the sum of 13 questions ranging from 13-39. Higher scores indicate a higher level of health literacy. Based on expert opinion; a score of 13-26 indicates "inadequate" health literacy and a score of > 26-39 indicates "adequate" health literacy. In the current study, its Cronbach  $\alpha$  was 0.830.

**Tool III: The Cancer Behavior Inventory-Brief Version (CBI-B)** (Heitzmann et al., 2011):

CBI-B is used to identify patients' confidence in their ability to do a special task related to self-efficacy in coping with cancer disease. It consisted of 12 items with a nine-grade options scale (1-9), reflecting various confidence levels, ranging from not at all confident (1-3), moderately confident (4-6), to totally confident (7-9). The total CBI-B score is obtained by the sum of the 12-item ranging from 12 to 108. Higher scores indicate greater coping efficacy.

**Tool IV: The Memorial Symptom Assessment Scale Short Form (MSAS-SF)**

It was adopted from Chang et al. (2000), this tool is a self-report scale where the patient mentions whether a symptom exists and, if occurred, the patient then scores symptom distress of 27 physical symptoms and symptom frequency of four psychological symptoms

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over the previous seven days. MSAS-SF was translated and modified by the researcher whereas one symptom (problem with sexual interest or activity) was deleted and symptom distress of physical symptoms is rated on a four-point (0–3) Likert scale instead of five-point: “Not at all,” “A little bit,” “Somewhat,” and “Very much”. Symptom frequency of psychological symptoms is rated on a four-point (1–4) Likert scale: “Rarely,” “Occasionally,” “Frequently,” and “Almost constantly. Total MSAS is obtained by the sum of 31 symptoms, ranging from 4 to 97. Higher scores indicate more severe symptom distress. In the current study, it’s Cronbach  $\alpha$  was 0.913.

## **The Health Literacy Intervention**

### **Assessment phase:**

This phase included the baseline assessment before the intervention. The researcher read and explained each item of the study tools to the older woman and then recorded her response to each item. Data collection took about 25-30 min to complete for each patient. The data were preliminary analyzed to provide the basis for building up according to identified needs.

### **Planning phase:**

The intervention was designed based on the identified needs obtained from the analysis of the baseline assessment and in view of the relevant literature [(Kim et al., 2019),(Pei-Hua et al., 2018)], the researchers developed the sessions of health literacy intervention; the theoretical content of the intervention was prepared in the form of an illustrative

booklet distributed to all patients in the study group. The practical sessions were prepared in the form of videos and pictures that demonstrate the exercises.

### **Implementation phase:**

In the study setting, the intervention was implemented in the form of six sessions (four theoretical and two practical) every two weeks for 30-45minutes The content of the theoretical sessions included a brief introduction about breast cancer and chemotherapy, the health literacy concept and its domains, chemotherapy side effects and its management. The practical sessions involved pursed lip breathing exercise and progressive muscle relaxation exercise. The sessions were introduced individually as well as in small groups (2 to 3 patients in each group) according to patient flow.

Regarding teaching methods; the researchers used interactive lectures with group discussions brainstorming, and demonstration to present the content of the intervention in the most understandable way. The sessions were supported by using booklet, posters, pictures, and videos. At the end of every session, the patients were asked to review the information they had been given and demonstrate the learned exercises. All patients were instructed to perform pursed lip breathing exercise and progressive muscle relaxation exercise by themselves in their homes twice daily.

### **Evaluation phase:**

The evaluation of the effectiveness of the intervention (post-test) was done after one month of the intervention to evaluate the degree of improvement of the

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patient's health literacy, self-efficacy, and symptoms distress.

## **Ethical Considerations**

This research took the ethical approval of the Research Ethics Committee (REC) and the Postgraduate Committee of the Faculty of Nursing at Zagazig University, Egypt. Verbal consent was taken from each patient after a full explanation of the study aim. Patients were allowed to refuse participation, and they were notified that they could withdraw at any stage of the data collection interviews. They were also assured that the information would be confidential and used for research purposes only. The researcher maintains the anonymity and confidentiality of the subjects' data.

## **Statistical analysis**

Statistical analysis was done using the SPSS 22 statistical software package. The descriptive analyses were expressed as frequencies, percentages, means, and standard deviations (SDs). Percentages of categorical variables were compared using the Chi-square test. Independent t-test was used to compare the means of the study variables between the study and control groups, and paired t-test was used to compare the means of the study variables pre and post-intervention in each group. In order to identify the correlation between the main study variables, Pearson's correlation coefficient was used. Statistical significance was considered at  $p$  value  $< 0.05$ . Cronbach alpha coefficient was measured to identify the reliability of the scales through their internal consistency.

## **Results**

### **Patients' Flow**

The study involved 100 patients; fifty patients were allocated to the study group and fifty for the control group. In either group, no patients discontinued the intervention (study group:  $n=0$ , control group:  $n=0$ ). As a result, 100 patients (study group:  $n=50$ , control group:  $n=50$ ) were involved for analysis (Figure 1).

### **Older women' characteristics in the intervention and control groups**

Table 1 indicates that the mean age of the study and control groups was 64.34 (SD= 5.57) years & 64.16 (SD= 3.28) years respectively. Regarding residence and marital status, 70% of the study group and 80% of the control group belonged to rural areas, 64% of the study group and 58% of the control group were married. In terms of education and monthly income, 60% of the study group and 58% of the control group can't read and write, 66% of the study group and 64% of the control group had insufficient income. Also, 60% of the study group and 62% of the control group lived with their spouse. There were no significant differences in terms of demographic characteristics between the study and control groups. The majority of patients in the study and control groups had stage three breast cancer (80% & 88%) respectively, finally; 36% of the study group received more than 6 chemotherapy cycles compared to 42% of the control group and those results were found to be statistically significant ( $p<0.05$ ).

### **Effects of the Health Literacy Intervention on Patient's Health Literacy, Symptoms Distress, and Self-Efficacy**

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**Table 2** reveals that there were no significant differences in terms of patients' health literacy, symptoms distress, and self-efficacy between the two groups in the pretest. This indicates the homogeneity of both groups at baseline. Table 2 also, reveals that the study group post-intervention reported improvement in the mean scores of communicative health literacy from 7.14(SD =1.11) to 8.94 (SD =1.43), critical health literacy from 4.51(SD =2.86) to 8.12 (SD =3.05), and total health literacy from 20.18(SD =5.89) to 26.63 (SD =6.01) and those improvements were statistically significant ( $p < 0.05$ ,  $< 0.01$  &  $< 0.01$ ) respectively. However, functional and empowerment domains of health literacy showed no statistically significant difference pre and post-intervention in the study and control groups.

Regarding self-efficacy in the study group, the mean score increased from 50.73 (SD =12.25) in the pretest to 73.14 (SD =15.41) after the intervention and this improvement was highly statistically significant ( $< 0.01$ ), while the control group showed no statistically significant difference pre and post-intervention. In term of symptoms distress, the study group showed a significant decrease in the mean score of physical symptoms from 19.59 (SD =2.3) to 17.14(SD =3.5, and highly statistically significant decrease in psychological symptoms from 11.71 (SD =2.4) to 7.95 (SD =1.6), and the total MSAS-SF mean scores from 31.3(SD =4.7) to 25.09 (SD =5.1) and these results were statistically significant ( $P < 0.05$ ,  $< 0.01$ , and  $< 0.01$ ) respectively. On the

other hand, there was no statistically significant difference in the control group's symptoms distress scores pre and post-intervention (Table 2).

## **Correlations between total health literacy, self-efficacy, and symptom distress scores post-intervention in the study group**

The study results indicated that total health literacy score was positively correlated to self-efficacy score ( $r = 0.501$ ). Concerning symptom distress score, it was negative correlated to total health literacy score ( $r = -0.478$ ) and self-efficacy score ( $r = -0.562$ ) (Table 3).

## **Predictors of self-efficacy and symptom distress improvement post-intervention in the study group**

Regarding predictors of self-efficacy improvement, Table 4 illustrates that high educational level was statistically significant independent positive predictor of self-efficacy score. While, age and living alone were statistically significant independent negative predictors of the self-efficacy score. The model explains 33% of the variation in this score as the value of r- square indicates.

Concerning predictors of symptom distress improvement, Table 5 indicates that sufficient income, being married, and high educational levels were statistically significant independent negative predictors of the symptom distress. While, living alone was statistically significant independent positive predictor of the symptom distress score. The model explains 41% of the variation in this score as the value of r- square indicates.

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## Discussion

The existing study results clarified that the patients in both study and control groups at the pre-test had inadequate health literacy. This might be attributed to the low level of education among most of them plus living in rural areas which are characterized by low medical services and low socioeconomic status that makes access to health information difficult to accomplish. They also had limited awareness regarding the importance of evaluating any health information they hear. In the same stream, a study conducted in Turkey by ÖZTÜRK & Şenyuva (2021) found that the majority of the chemotherapy patients had poor and limited-problematic health literacy levels .

Controversy, a large cross-sectional study conducted in America by Kanu et al. (2022) reported that more than three-quarters of the patients had adequate health literacy. Such discrepancy between results might be attributed to differences in educational level, high socioeconomic status, availability of medical services, and easy accessibility of health information from different resources in this country .

After the implementation of the current study intervention, the functional and empowerment health literacy domains remain the same in the study and control groups because the functional domain reflects the ability to read and write, and empowerment is the social strategy that allows people to take control of their life by altering their social and political community, so those domains are difficult to be changed by this intervention. Also,

the control group had no statistically significant difference in all health literacy domains .

Meanwhile, there were statistically significant improvements in the mean scores of communicative, critical, and total health literacy in the study group. This improvement was highly significant, especially in the critical domain. This might be attributed to the content of the intervention, which focused on improving communication between patients and their health professionals by encouraging them to ask questions, report their health condition in a straightforward way and also be sure that the health information is obtained from reliable sources. In the same line with the study group results, a study conducted in Iran by Bahrami & Behbahani (2019) concluded that the health literacy promotion program can improve the level of health literacy as they found that there were significant changes in the health literacy level immediately after the intervention and 1 month later .

Considering the level of self-efficacy among older women with breast cancer pre-intervention; the existing study results clarified moderate mean self-efficacy score among the study and control groups. This finding can be attributed to a variety of reasons including; the diagnosis of cancer itself can be one of the most terrifying things that someone may face, also treatment with chemotherapy results in many side effects that disturb one's life as it increases functional impairments that make the patients more dependent. Also, the complexity of the process of obtaining

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treatment as it takes too much time and effort .

Lastly, some characteristics of the study findings whereas the highest percentages of the participants were not read and write, had inadequate knowledge, and high psychological symptoms distress that made them unable to understand the nature of the disease process or find ways to cope with it. In the same vein, a study in Egypt carried out by Abd-Elrhman et al. (2022) showed that more than half of breast cancer women had low scores regarding self-efficacy.

Controversy, Chee et al. (2022) carried out a study in America who reported a little higher self-efficacy mean score [75.32 ( SD= 19.79)]. This difference might be due to all patients in this study were highly educated and had early-stage breast cancer beside high-quality health care services in this country which focus on psychological aspects and group therapy all these factors may increase the chance of cancer coping.

Referring to the post-intervention self-efficacy in the study and control groups, the existing study results indicated that there was highly statistically significant improvement in the mean self-efficacy score in the study group. On the other hand, there was no statistically significant difference in the control group self-efficacy mean score. This might be attributed to that one of the most important parts of the intervention was stress management strategies through relaxation techniques such as deep breathing exercise and progressive muscle relaxation exercise. Moreover, the researchers

provided the reassurance and support through-out the intervention. Those are important in lowering stress level and allow the patients to cope effectively .

Additionally, the post-intervention increases in total health literacy and decreases in symptoms distress scores reinforce the patient's competence in coping with cancer disease. Similarly, Kim et al. (2019) who conducted a study in Korea concluded that in comparison to the control group, the study group's self-efficacy improved significantly after the intervention.

Regarding pre-intervention symptoms distress; the existing study results clarified that the patients in both study and control groups had lower total MSAS-SF mean score. In more detail, they had lower physical symptoms distress and moderate psychological symptoms distress. A possible explanation of such results is that the researchers excluded stage four breast cancer which is characterized by the most severe symptoms. In congruence with this, a lower symptom distress mean score was found among the breast cancer patients in a study carried out in Taiwan by Tsai et al.(2021) . In addition, a study in Egypt conducted by Abd El Fatah et al. (2023) concluded that moderate and severe psychological distress was reported by 40% and 53.3% respectively among the study and control groups pre-interventions.

As to post-intervention symptoms distress in the study and control groups, the existing study results revealed that the study group had statistically significant decreases in the mean score of physical



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symptoms and highly statistically significant decreases in psychological symptoms and the total MSAS-SF mean scores. On the other hand, there was no statistically significant difference in the control group symptoms distress scores. This might be attributed to the commitment of the patients in the study group in the application of the information they taught regarding symptom-management, beside the emotional support received by the researcher during intervention and encouraging the patients to express their feelings .

In the same stream with the study group results, a study conducted in multicenter in the European Union by Maguire et al. (2021) displayed that the analysis of MSAS sub-domains indicated significant reductions in psychological symptoms and physical symptoms in the study group compared to the control group that showed significant increase throughout the study phases. Similarly, another study in Sweden by Fjell (2020) revealed that the total symptom distress and physical symptom distress were significantly lower in the study group.

The study results indicated that health literacy was significantly positively correlated to self-efficacy. That is patients with a higher level of health literacy have better coping performance. This might be due to health literacy is the basis and reflection for coping behavior. In the same vein, a study in America carried out by Gunn et al. (2020) displayed that having inadequate health literacy was associated with lower self-efficacy.

The study findings clarified that symptom distress was significantly negatively correlated to health literacy and self-efficacy in the study group post-intervention. This might be due to that patients with low health literacy may be unable to determine possible troubling symptoms at the appropriate time, causing the symptoms to become more bothersome and adaption more difficult.

In agreement with this, a study in India by Gupta et al. (2020) concluded that lower health literacy was associated with more severe adverse drug reactions in cancer patients on chemotherapy. Additionally, García-García et al. (2019) who conducted a study in Spain found that the higher the physical and psychological symptom distress, the poorer the coping strategies in breast cancer patients. Moreover, Baik et al.(2020) who conducted a study in America stated that higher self-efficacy was associated with fewer symptom burdens and less total cancer distress. Finally, a study conducted in Canada by Papadacos et al. (2022) found that the symptom severity was found a negative predictor and mediator of the contribution of self-efficacy to chemotherapy self-management in hierarchical multivariate regression.

Regarding predictors of self-efficacy; our findings exposed that age was a statistically significant independent negative predictor for self-efficacy improvement. So the more advanced age, the lower the self-efficacy mean score. This might be due to the advanced age usually related to many functional, cognitive, and psychological problems that

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interfere with their ability to cope with their disease and control their health. In the same context, a study in South Korea carried out by Lee et al. (2023) concluded that age showed a statistically significantly negative correlation with self-efficacy.

The study results revealed also that educational level was a positive predictor for self-efficacy improvement. This result might be attributed to the fact that the highly educated patients were able to communicate efficiently with healthcare personnel making them more receptive to health education messages. Therefore, they have better control over their situation. In agreement with this, a study conducted by Ali et al. (2020) in Malaysia demonstrated that higher educational level was positively correlated with self-efficacy for coping with breast cancer.

Based on the study finding, living alone was a statistically significant independent negative predictor for self-efficacy improvement. This result might be due to women who live alone do not have enough social support and may suffer from higher levels of stress. The stress of a cancer diagnosis combined with the absence of social network may hinder patients' cancer coping. In the same context, Attaran Khorasani et al. (2023) who conducted a study in Iran to examine “the structural pattern of personality traits of cancer patients on treatment adherence and cancer coping self-efficacy mediated by social support” reported that social support was positively correlated to self-efficacy.

Concerning predictors of symptoms distress, the present study

indicated that educational level was a significant independent negative predictor for symptoms distress improvement. This might be due to that the educated patients can understand and apply health instructions related to symptoms management more easily than uneducated patients. In the same context, Erdemsoy Karahan & Izgu (2023) who conducted a study in Turkey to explore “the correlations between symptom burden, functional status, and self-efficacy in advanced breast cancer patients”, concluded that less-educated patients had higher symptom burden.

According to the study results; being married was a significant independent negative predictor for symptoms distress improvement. Additionally, living alone was a significant independent positive predictor for symptoms distress improvement. This result might be due to the social and emotional support received from their family during the treatment period makes the patients more able to tolerate and overcome their symptoms.

Likewise, a study conducted in China by Li et al. (2021) clarified that marital status was a statistically significant independent negative predictor for total symptoms distress in multiple linear regression analysis. Similarly, another study in America carried out by Mazanec et al. (2021) stated that patients with lower social support had higher symptom distress.

Finally, monthly income was a negative predictor for symptoms distress improvement. The higher the income, the

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lower the total symptoms distress mean score. This result might be attributed to that the patients with low economic status lose the opportunity to get enough resources for obtaining health-related information which hinders the patient's ability to self-manage their symptoms. Furthermore, poverty increases the patient's psychological distress, whereas money increases confidence, reduces stress, and fear of the future. In agreement with this, Mazanec et al. (2021) who carried out a study in America found that greater perceived economic hardship was associated with higher symptom distress.

## **Conclusion**

The study findings revealed that the health literacy intervention resulted in improvement in communicative, critical, and total health literacy of the study group post-intervention compared to the control group. However, functional and empowerment domains of health literacy showed no difference pre and post-intervention in the study and control groups. Furthermore, the study group reported an increase in self-efficacy after the intervention compared to the control group. The study results also indicated a reduction in symptoms distress in the

study group after the intervention, while the control group remained the same. Moreover, total health literacy score in the study group after the intervention was positively correlated to self-efficacy score, while symptom distress score was negatively correlated to total health literacy and self-efficacy scores.

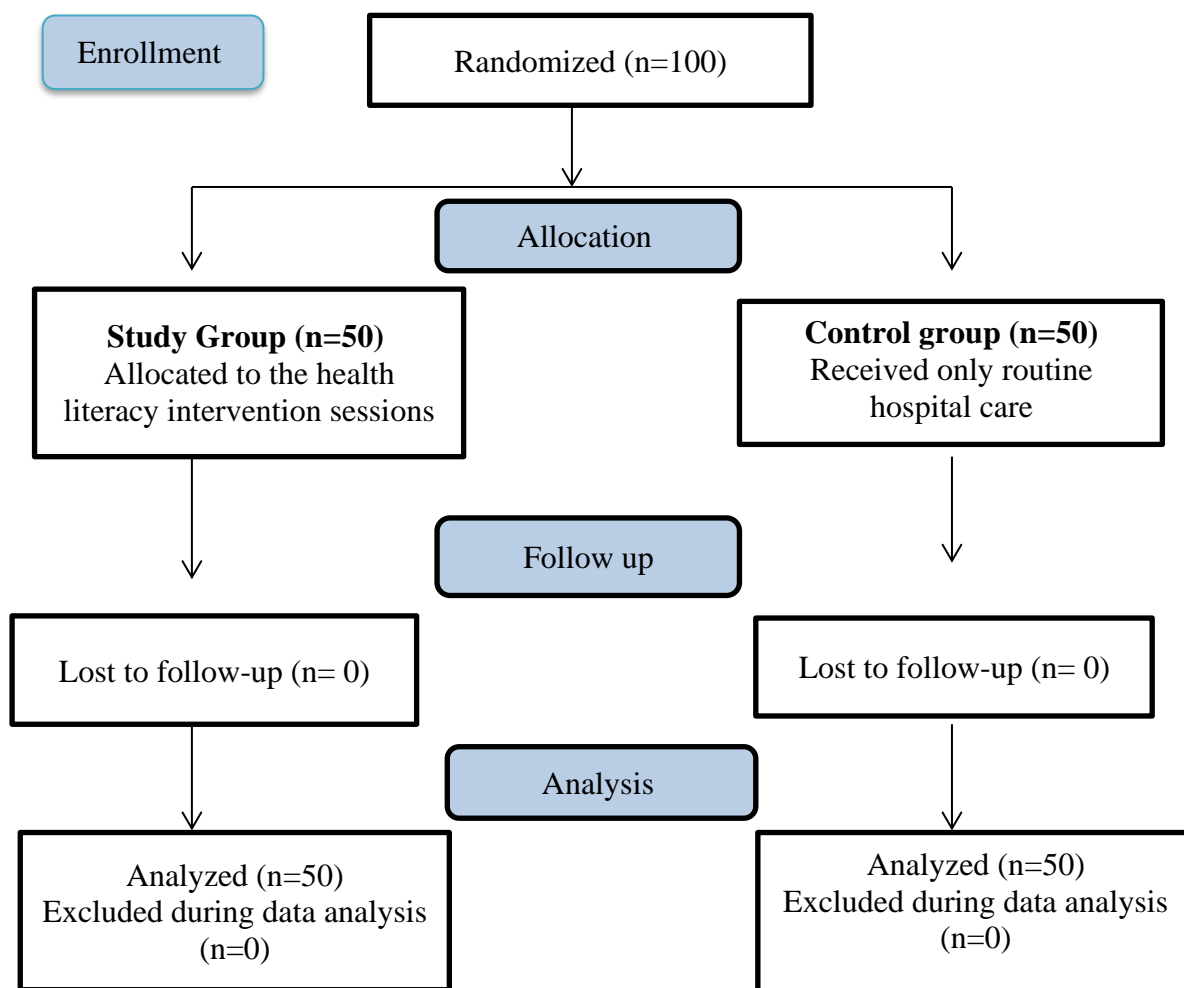
Finally, the significant predictors of self-efficacy's improvement were age, high educational level, and living alone. Meanwhile, high educational level, being married, sufficient income, and living alone were significant predictors for symptoms distress's improvement. Based on our study findings, the health literacy intervention was effective and could be used to enhance patients' health literacy, self-efficacy, and decrease symptoms distress in older breast cancer patients undergoing chemotherapy.

## **Declaration of Conflicting Interests**

The Author(s) declare(s) that there is no conflict of interest.

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**Figure 1. CONSORT flow diagram**

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**Table (1):** Older women's characteristics in the intervention and control groups (n = 100).

Variables	Study group (n=50)		Control group (n=50)		X <sup>2</sup> test P value
	No	%	No	%	
<b>Age (years)</b>					
60-<70	41	(82.0)	42	(84.0)	1.951
70-<80	9	(18.0)	8	(16.0)	>0.05
Mean± SD	64.34±5.57		64.16±3.28		
<b>Residence</b>					
Rural	35	(70.0)	40	(80.0)	4.253
Urban	15	(30.0)	10	20.0	>0.05
<b>Marital status</b>					
Married	32	(64.0)	29	(58.0)	1.649
Unmarried	18	(36.0)	21	(42.0)	>0.05
<b>Educational level</b>					
Not read and write	30	(60.0)	29	(58.0)	
Read & write	2	(4.0)	2	(4.0)	2.086
Primary education	5	(10.0)	6	(12.0)	>0.05
Secondary education	10	(20.0)	9	(18.0)	
University education	3	(6.0)	4	(8.0)	
<b>Monthly income</b>					
Not sufficient	33	(66.0)	32	(64.0)	1.618
Sufficient	17	(34.0)	18	(36.0)	>0.05
Sufficient and save	0	(0.0)	0	(0.0)	
<b>Living with</b>					
Alone	5	(10.0)	2	(4.0)	1.704
Spouse	30	(60.0)	31	(62.0)	>0.05
Sons /relatives	15	(30.0)	17	(34.0)	
<b>Stage at diagnosis</b>					
Stage I	0	(0.0)	0	(0.0)	
Stage II	6	(12.0)	10	(20.0)	3.866
Stage III	44	(88.0)	40	(80.0)	<0.05*
<b>Number of Chemotherapy cycles currently received</b>					
<3	16	(32.0)	8	(16.0)	
3-6	16	(32.0)	21	(42.0)	4.023
>6	18	(36.0)	21	(42.0)	<0.05*

$\chi^2$  = Chi square test; p < .05 significant.

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**Table (2):** Health literacy, self-efficacy, and symptoms distress in the study and control groups (N=100)

Variables	Group	Pre-test	Post-test	Index scores	Paired t-test	P
		M±SD	M±SD			
<b>Domains of health literacy</b>						
Functional health literacy	<b>Study</b>	5.32±0.94	5.89±1.02	<b>3-9</b>	0.102	>0.05
	<b>Control</b>	5.77±0.81	5.78±0.89		0.034	>0.05
	<sup>^</sup> P value	1.994	1.802	>0.05	>0.05	
Communicative health literacy	<b>Study</b>	7.14±1.11	8.94±1.43	<b>3-9</b>	3.652	<0.05*
	<b>Control</b>	7.23±1.35	7.75±1.39		1.624	>0.05
	<sup>^</sup> P value	1.217	2.977	>0.05	<0.05*	
Critical health literacy	<b>Study</b>	4.51±2.86	8.12±3.05	<b>4-12</b>	8.712	<0.01**
	<b>Control</b>	4.40±2.42	4.45±2.45		1.534	>0.05
	<sup>^</sup> P value	1.951	8.555	>0.05	<0.01**	
Empowerment health literacy	<b>Study</b>	3.21±0.98	.368±0.51	<b>3-9</b>	1.045	>0.05
	<b>Control</b>	3.30±0.64	3.32±0.62		0.231	>0.05
	<sup>^</sup> P value	1.644	1.502	>0.05	>0.05	
<b>Total AAHLS</b>	Study	<b>20.18±5.89</b>	<b>26.63±6.01</b>	<b>13-39</b>	12.701	<0.01**
	Control	<b>20.70±5.22</b>	<b>21.30±5.35</b>		1.503	>0.05
	<sup>^</sup> P value	0.641	11.123	>0.05	<0.01**	
<b>Self-efficacy</b>						
	Study	<b>50.73±12.25</b>	<b>73.14±15.41</b>	<b>12-108</b>	11.365	<0.01**
	Control	<b>49.92±12.02</b>	<b>51.78±10.33</b>		1.195	>0.05
	<sup>^</sup> P value	1.405	8.726	>0.05	<0.01**	
<b>Symptoms distress</b>						
Physical symptoms	<b>Study</b>	19.59±2.3	17.14±3.5	<b>0-81</b>	3.765	<0.05*
	<b>Control</b>	18.5±3.5	18.1±2.9		1.004	>0.05
	<sup>^</sup> P value	1.211	1.744	>0.05	>0.05	
Psychological symptoms	<b>Study</b>	11.71±2.4	7.95±1.6	<b>4-16</b>	6.887	<0.01**
	<b>Control</b>	11.17±1.9	10.22±1.7		1.228	>0.05
	<sup>^</sup> P value	0.864	4.675	>0.05	<0.05*	
<b>Total MSAS-SF</b>	<b>Study</b>	<b>31.3±4.7</b>	<b>25.09±5.1</b>	<b>4-97</b>	7.800	<0.01**
	<b>Control</b>	<b>29.6±5.4</b>	<b>28.3±4.6</b>		1.317	>0.05
	<sup>^</sup> P value	1.643	5.872	>0.05	<0.05*	

<sup>^</sup> Independent t-test. \*Significant at p <0.05. \*\*Highly significant at p <0.01

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**Table (3)** Correlation between health literacy, symptoms distress, and self-efficacy total scores post-intervention in the study group

Variables		Health literacy	Self-efficacy	Symptom distress
<b>Health literacy</b>				
<b>Self-efficacy</b>	r.	0.501		
	p.	<0.01**		
<b>Symptom distress</b>	r.	-0.478	-0.562	
	p.	<0.01**	<0.01**	

r = Correlation coefficient. \*Significant at  $p < .05$ . \*\*Highly significant at  $p < .01$ .

**Table (4):** Best fitting multiple linear regression model for the self-efficacy

Items	Unstandardized	standardized	T test	P. value
	Coefficients	Coefficients		
	<i>B</i>	B		
<b>Age</b>	-.188	.124	2.654	.037*
<b>Educational level (High)</b>	.192	.136	3.012	.014*
<b>Living condition (Alone)</b>	-.179	.118	2.435	.040*
Model Regression	<b>R<sup>2</sup></b>	<b>Df.</b>	<b>F</b>	<b>P. value</b>
	<b>0.33</b>	2	8.106	.003**

\*Significant at  $p < 0.05$ . \*\*Highly significant at  $p < 0.01$ . Not significant at  $p > 0.05$

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**Table (5):**Best fitting multiple linear regression model for the symptom distress

Items	Unstandardized	standardized	T test	P. value
	Coefficients	Coefficients		
	<i>B</i>	<i>B</i>		
<b>Educational level (High)</b>	-.223	.197	3.104	.021*
<b>Marital status (Married)</b>	-.181	.127	2.533	.041*
<b>Income (Sufficient)</b>	-.166	.114	2.201	.043*
<b>Living condition (Alone)</b>	.208	.163	2.765	.039*

Model	R <sup>2</sup>	Df.	F	P. value
Regression	<b>0.41</b>	3	8.666	.002**

\*Significant at p <0.05. \*\*Highly significant at p <0.01. Not significant at p>0.05

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