Effectiveness of Mindfulness-Based Interventions for Reducing Anxiety among Post-Operative Breast Cancer Women at Nasser Institute-Egypt

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Abstract

Background: Breast cancer is characterized by negative aspects including physical, mental and psychological symptoms. Mindfulness-Based Interventions (MBIs) are psychological approaches that incorporate mindfulness practices to promote awareness, non-judgmental acceptance, and present-moment focus. **Aim of the study:** The study aimed to evaluate the effect of MBIs for reducing anxiety among post-operaive breast cancer women. **Research design:** A quasi-experimental design was utilized. **Setting:** The study was conducted at Nasser Institute for oncology. **Subject:** A convenience sample of post-operaive breast cancer women (n= 30). **Tools of data collection:** Three tools were used for data collection; First tool: Structure questionnaire for socio-demographic data, and women's knowledge assessment; Second tool: Freiburg Mindfulness Inventory (FMI) a Likert-type self-report scale; Third tool: Hamilton Anxiety Rating Scale (HAM-A). **Results:** The result revealed that the majority more than twothirty of breast cancer women have high awareness about mindfulness with a statistically significant difference between pre and post-training intervention ($X2 = 56.143$ & $P = < 0.001^{**}$) and the anxiety reduced where the majority more than half of breast cancer women have mild anxiety regarding MBIs with a statistically significant difference between pre and post-training intervention ($X2 = 24.178$ & $P=< 0.001^{**}$). **Conclusion:** The study concluded that; the Mindfulness-Based Interventions for breast cancer women had significant reducing in women's level of anxiety. **Recommendations:** The study recommended that; MBIs program should be included in the protocol of treatment as a psychological support for reducing anxiety among breast cancer women.

Keywords: *Anxiety, Breast Cancer, Mindfulness Based Interventions.*

Introduction:

Breast cancer is a type of cancer that begins in the cells of the breast. It is one of the most common forms of cancer affecting women, although men can also develop breast cancer (albeit at a much lower rate). Breast cancer is a compilation of distinct malignancies that manifests in the mammary glands. Breast cancer consists of a group of biologically and molecularly heterogeneous diseases originated from the breast. There are many types of breast cancers like that can present in distinct areas of the breast, such as the ducts, the lobules, or the tissue in between **(Reme et al., 2022)**.

Breast cancer is characterized by negative aspects including physical, mental and psychological symptoms. Anxiety can become a pathological disorder when it is excessive and uncontrollable, requires no specific external stimulus, and manifests with a wide range of affective symptoms and changes in behavior and cognition **(Liu et al., 2022; Reme et al., 2022)**.

Anxiety is usually expressed through uncontrollable worry, intense fear that takes the form of panic attacks, upsetting dreams, or flashbacks. Patients describe an uncontrollable fear, restlessness, hyper-vigilance, insomnia, dyspnea, tachycardia, numbness, fatigue, or muscle tension. Anxiety may ensue after receiving the diagnosis of breast cancer, during the treatment phase, or later, in the disease-monitoring stage (*Tsaras k et al. , 2018*).

Many women with breast cancer turn to complementary therapies to deal with the symptoms of the disease. A total of 33% to 47% of women worldwide and 48% to 80% of American women make use of such therapies, and *meditation* is one of complementary alternatives that positively influences the rehabilitation by reducing pain, stress, anxiety, depression, fatigue, and even the side effects caused by drug treatments. Meditation was originally proposed by **Kabat-Zinn** and it has been successfully incorporated in a number of clinical interventions **(Del-Castanhel and Liberali, 2018)**.

Mindfulness-Based Interventions **(MBIs)** are psychological approaches that incorporate mindfulness practices to promote awareness, non-judgmental acceptance, and present-moment focus. These interventions have gained popularity in healthcare settings, including for particularly helpful in dealing with common experiences related to cancer diagnosis, treatment, and survivorship, including loss of control, uncertainty about the future, and fears of recurrence, as well as a range of physical and psychological symptoms, including depression, anxiety, insomnia, and fatigue **(Wang et al., 2022)**.

Currently, there is a range of therapeutic approaches based on mindfulness, such as Mindfulness-Based Eating Awareness Training **(MB-EAT)**, Mindfulness-Based Relationship Enhancement **(MBRE)**, Mindfulness-Based Relapse Prevention **(MBRP)**, Mindfulness-Based Cognitive Therapy **(MBCT)** and Mindfulness-Based Stress Reduction **(MBSR)**. Mindfulness-Based Stress Reduction is a standard protocol that addresses multiple forms of mindfulness practice, with elements of hatha yoga added to it **(Del-Castanhel and Liberali, 2018)**.

Aim of the study:

The aim of the study is to evaluate the effectiveness of mindfulness-based intervention for reducing anxiety among post-operative breast cancer women through:

1- Assessing the anxiety level among post-operative breast cancer women for pre, post, and follow up the MBIs program.

2- Assessing the mindfulness among post-operative breast cancer women for pre, post, and follow up the MBIs program.

3- Applying the Mindfulness Based-Interventions program among post-operative breast cancer women.

4- Evaluating the effect of Mindfulness Based-Interventions program among post-operative breast cancer women post, and follow up the MBIs program.

Hypothesis

The Mindfulness Based-Intervention program will have a positive effect on post-operative breast cancer women.

Significance of the Study

In Egypt, breast cancer is the most common cancer among women, representing 18.9% of total cancer cases with an age adjusted rate of 49.6 per 100 000 population **(Elsheshtawy et al., 2014).** Breast cancer is the most common cancer type among females worldwide, as 1 in 8 women will be diagnosed with the disease in their lifetime **(Christensen and Marck, 2017).** Breast cancer is becoming more significant in many developing countries.

Anxiety is a major sign with breast cancer and can be the major cause of relapsing or mastitis. MBIs are particularly helpful in dealing with common experiences related to cancer diagnosis, treatment, and survivorship, including loss of control, uncertainty about the future, and fears of recurrence, as well as a range of physical and psychological symptoms, including depression, anxiety, insomnia, and fatigue.

Research Design:

A quasi-experimental research design was utilized in this study.

Research Setting:

The current study was conducted at Nasser Institute for oncology including outpatient units. This is one of the largest specialized medical centers and one of the most important providers of health care services in Egypt, inaugurated in 1987.

Research Subjects:

All women who are diagnosed with breast cancer undergoing chemotherapy after surgical operation, their number was 30 women.

Subject/ Sampling:

All post-operative breast cancer women after the operation.

Type of the sample:

Convenience sampling that involves readily available people for the study

Sample size:

$$n = \left(\frac{z \bullet s}{E} \right)^2$$

E is the allowable error, **z is the z-** value corresponding to the selected level of confidence, and **s** is the sample deviation of the pilot survey.

Sample criteria:

The women who diagnosed with breast cancer post-operative, including stages from 0 stage to 4th stage.

Inclusion criteria

1- Female patients diagnosed with breast cancer from stage 0 to 4th stage of breast cancer.

2- Breast cancer women aged from 18 to 50 years.

3- Women with breast cancer after operation, during chemotherapy period.

Exclusion criteria

1- Women suffering from mental disorder or psychotic diseases.

2- Women with any body shape deformity which obstacle the practicing of the intervention.

Tools for data collection:

Tool one: A structured questionnaire format:

This tool was developed by the researchers based on a review of the literature; it includes the required data related to breast cancer women as follows:

Part I:- Characteristics of breast cancer women included; age, address, marital status, number of children, occupation, educational levels, stage of breast cancer, and heredity….etc.

Part II knowledge assessment (Pre, post & follow-up): about breast cancer questionnaire that aimed to assess the knowledge about breast cancer through multiple choices questions (MCQ) with breast cancer women, it contains 10 items, ex: assess the definition, causes, signs, and types of breast cancer. The answer of the questions converted to Satisfactory >60% (4-6) and Unsatisfactory <60% (0-3).

Tool two: Freiburg Mindfulness Inventory (FMI). (Wallach H et al., 2006) (Pre, post-test & follow-up):

FMI aimed to assess a core characteristic of mindfulness, emphasizing the attention and attitudinal qualities that comprise the construct, namely, open or receptive awareness of and attention to what is taking place in the present. It was developed by Wallach H et al., 2006. It has been modified, up graded and translated into Arabic.

Scoring system of (FMI):-

It contains 14 items a Likert-type self-report scale with a rating between 1 (rarely) and 4 (almost always). Consisting of The short scale demonstrated sensitivity to change [56] and high internal consistency ($\alpha = 0.84$). The 14-item form of the scale was developed as a one-factor unidimensional scale. It is a valid and reliable questionnaire for measuring mindfulness. Add up all items to get one summary score.the answer converted 14-19 low awareness, 20-37 moderate awareness, and 38-56 high awareness.

Tool three: Hamilton Anxiety Rating Scale (HAM-A). (Hamilton, 1959) (Pre, post, and follow-up):-

This scale is one of the first rating scales developed to measure the severity of anxiety symptoms, and is still widely used today in both clinical and research settings. The scale consists of 14 items, each item is scored on a scale of 0 (not present) to 4 (severe) each defined by a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety).

Scoring system (HAM-A): -

The scale consists of 14 items, each item is scored on a scale of 0 (not present) to 4 (severe); normal anxiety 0-14, mild anxiety 15-28, moderate anxiety 29-42, and severe anxiety 43- 56.

Operational design:

Exploratory phase:

A pilot study was carried out on 10% represented (3) women of the total study sample (30 cases), in order to ensure reliability, clarity of questions and applicability of the tools, the time needed to complete the tools and perform the required modifications according to the available resources. Subjects who shared in the pilot study were included in the main study sample.

Ethical considerations: The ethical considerations in the study included the following:

- All the gathered data was used for research purposes only.
- The study sample was informed about the purpose and expected outcomes of the study and they were assured that the study is harmless, and their participation is voluntary and they have the right to withdraw from the study at any time and without giving any reason.
- They were assured also that anonymity and confidentiality were guaranteed.

Field Work:

The actual fieldwork was carried out over 6 months from beginning of December 2022 up to the end of May 2023. The researchers were available in the study setting 2 days/week. The researcher met the women on Mondays for group (1) from 09:00 – 10:30 am and Tuesdays for group (2) from 09:00 – 10:30 am in outpatient unit at Nasser institute, each group consisted of 15 women. The instructional program included one acquaintance session and 12 sessions (4 for theoretical part and 8 for practical part) and one data collection session. The sessions were delivered throughout 12 weeks. The actual field was divided into five phases:

Assessment phase:

During this phase, the researchers used the pre-constructed tools in collecting the data about women's sociodemographic data and knowledge related to breast cancer and tools to assess mindfulness and anxiety level among breast cancer women as (pre-intervention of program MBIs). The time provided for fulfilling the structured questionnaire format was 30-45 minutes.

Planning phase:

The Mindfulness-Based Interventionswas designed on the light of the literature review and according to the actual needs of the studied women that were determined in the assessment phase. The content of the Mindfulness-Based Interventionsincluded knowledge about breast cancer and anxiety and mindfulness based interventions (MBIs) as well as the application of the MBIs technique.

Implementing phase:

The total number of sessions was Twelve sessions; Four theoretical sessions which include knowledge abut breast cancer (definition, causes, signs and symptomps, types, and preventive measures) as well as knowledge about anxity (definition, causes, effect of anxiety on the individual, and hoe to deal with anxiety) and knowledge about mindfulness (definition, benefits, and types). In addition, Eight practical sessions about MBIs application including interventions of formal practice through body scan, mindfull breathing, Hatha yoga, mindfull sitting, and mindfull loving-kindness practice toward the self. At the end of each practical session was giving the women an informal practice of mindfulness as a home work like mindfull eating, drinking, walking and all routine daily activities then discuss the effect of it for each studied woman at the beginning of the next session.

MBIs was carried out weekly before sessions of chemotherapy, through group therapy using audio-guided meditation. Different teaching methods were used as; group discussion, brainstorming, lecture, homework activity role play demonstration, and re-demonstration. Suitable media was used as; handouts, PowerPoint, booklet, Video, poster, and script.

Evaluation phase:

Upon the completion of the Mindfulness-Based Interventionsintervention, a post-test was done by using the same assessment tools for women to evaluate the outcomes of the Mindfulness-Based Interventionsby using the

women's assessment knowledge related to breast cancer; and evaluate women's level of anxiety regarding the application of MBIs program.

Follow-up phase:

Follow-up was conducted for breast cancer women after 3 months by using the same tools, evaluatin knowledge about breast cancer, severity of anxiety, and mindfulness.

Program appraisal was done by comparing the women's knowledge and practice before, after, and follow-up the training program.

Administrative design:

Official permission was obtained from the Dean of Faculty of Nursing Helwan University, Nasser Institute in Cairo where the study was conducted and the permission of Ministry of Health.

Statistical Design:

The data obtained was organized, analyzed, and presented in the form of tables and figures using the Statistical Package for Social Sciences (SPSS) Version 22. Qualitative variables were presented in the form of frequencies and percentages; quantitative variables were presented in the form of mean and SD. Chi-square (x^2) and Pearson's correlation coefficient (r) tests were used to test the significance of the results obtained. A statistically significant difference was considered at $P < 0.05$.

Results:

Table (1): Number and percentage distribution of the studied women according to their socio-demographic data (N=30).

Socio-demographic data	No.	%
Age (years)		
38 - 45 years	10	33.3
> 46years	20	66.7
Mean±SD 48.33±7.25		
Mitral status		
Married	30	100.0
Address		
In-Cairo	22	73.3
Out-Cairo	8	26.7
Occupation	10	33.3
Worker	10	33.3
House-wife	20	66.7

Table (1) shows the socio-demographic characteristics of women with breast cancer and found that 33.3% of them ranged 38 - 45 years and 66.7% are >46 years with a Mean ±SD of 48.33±7.25. Regarding to marital status found that (100%) are married. In addition 73.3% of them lived in-Cairo and 26.7 % lived out-Cairo. Regarding occupation found that 66.7% house-wife and 33.3%worker.
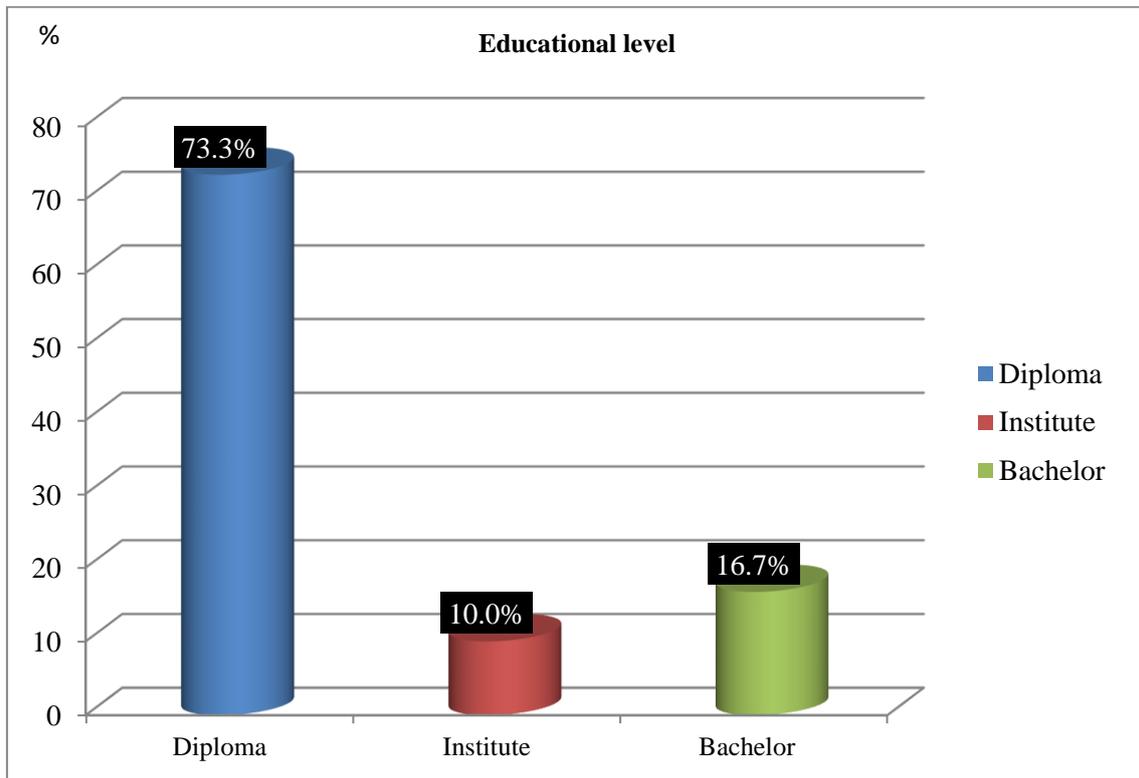
Figure (1): Percentage distribution of the studied women
according to their educational level (n=30).

Table (2): Number and percentage distribution of the studied women according to their medical history of breast cancer (n=30).

Item	No.	%
Number of relapsing		
1st time of disease	30	100
Type of current treatment		
Chemotherapy treatment	30	100
Do you have heredity with the disease?		
Yes	10	33.3
No	20	66.7
If the answer of heredity is (Yes), who is the relative?		
Yes, Mothers have breast cancer	10	33.3
Did you have other diseases?		
Hypertension + Diabetes	10	33.3
Hypertension	10	33.3
No other diseases	10	33.4
How did you discover the disease?		
Nodules in breast)	22	73.3
Pain in breast	5	16.7

Breast self-examination	3	10.0
Degree of improvement during treatment		
Mild improvement	8	26.7
Moderate improvement	20	66.7
High improvement	2	6.7
Using of other strategies to deal with anxiety		
No	30	100.0

Table (2) reveals the medical history of the studied women and found that more than half of them (73.3%) in 2nd stage of the disease and (26.7%) in 3rd stage of the disease. Regarding relapsing of the disease found that (100%) are 1st time without relapsing. Moreover more than two-third of them (66.7%) hasn't heredity and (33.3%) has heredity with their mothers.
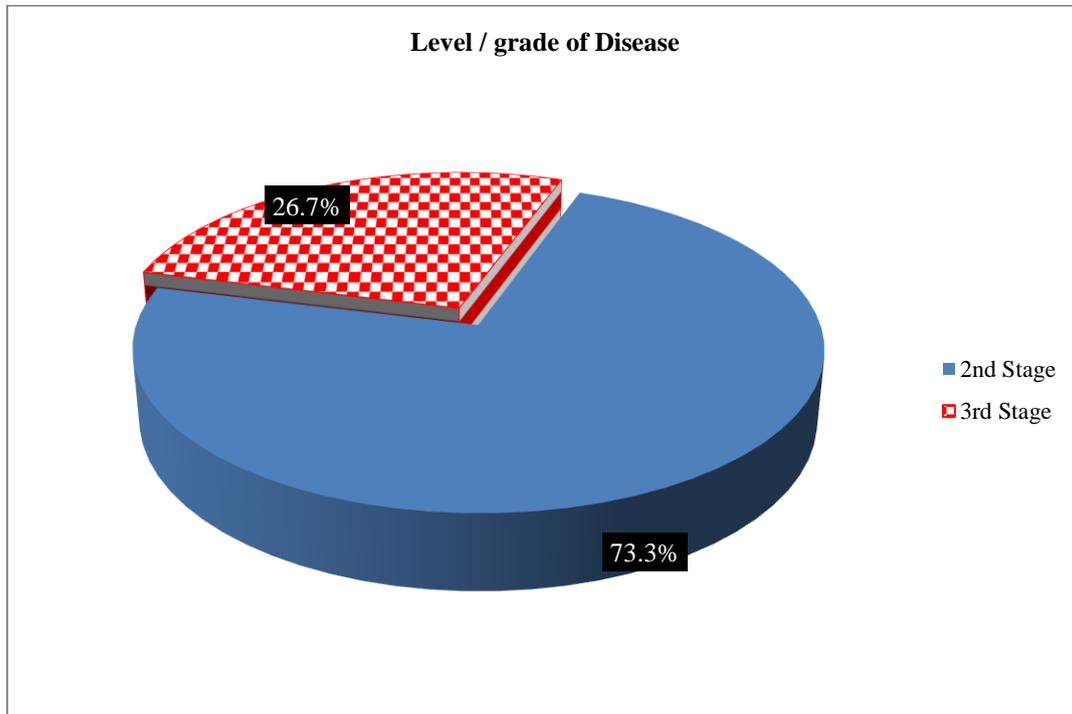

Figure (2): Percentage distribution of the studied women according to their level/ grade of disease (n=30).

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Table (3): Number and percentage distribution of the studied women according to their total knowledge about breast cancer of (pre/ post & follow up) (N=30).

Knowledge	Pre Program		Post Program		Follow UP Program		Pre-Post		Pre-FU	
	No.	%	No.	%	No	%	x^2	p-value	x^2	p-value
Satisfactory >60% (4-6)	14	46.7	26	86.7	24	80.00				
Unsatisfactory <60% (0-3)	16	53.3	4	13.3	6	20.00				
Total	30	100.0	30	100.0	30	100.0	9.075	0.003*	8.919	0.015*
Mean score ±SD	2.38±1.04		4.38±1.27		3.97±1.18					
Range	1-4		3-6		2-5					
%Percentage of change	--		84.03%		79%					

Table (3) reveals that there is statistically significant difference between pre and post knowledge assessment regarding the total knowledge about breast cancer among breast cancer women at p-value 0.003* with percentage of change 84.03 %.
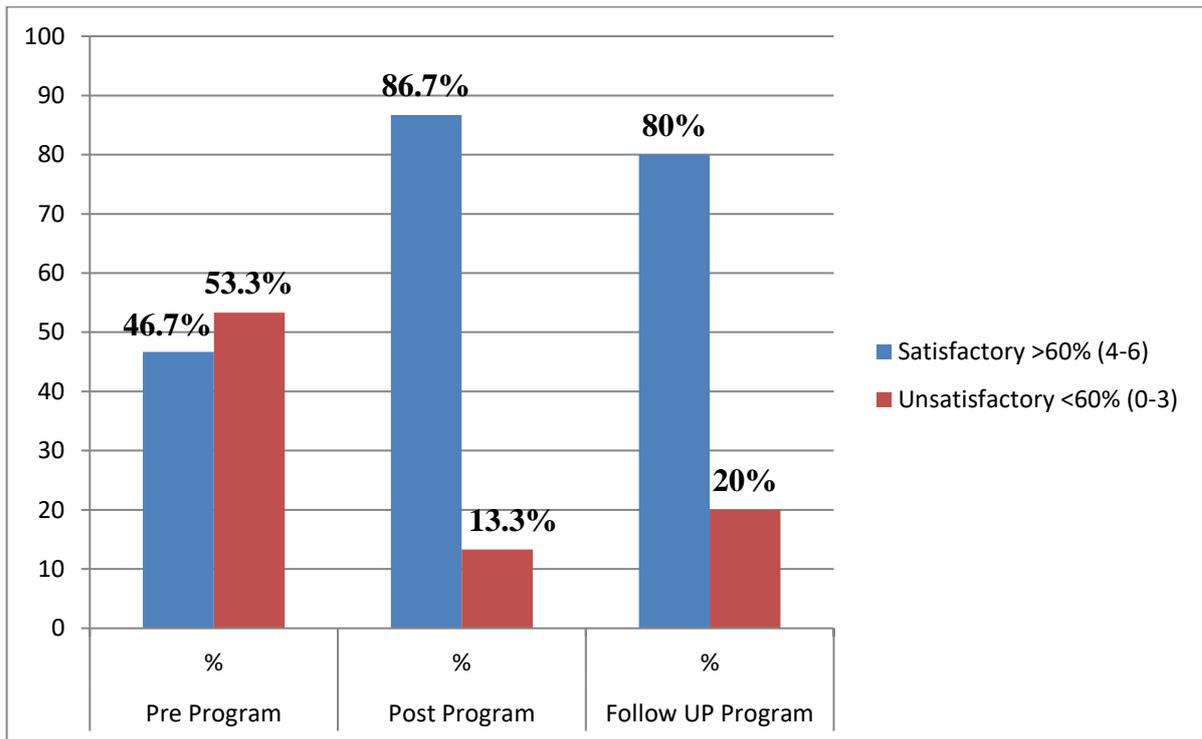
Figure **(3):** Number and percentage distribution of the studied women according to their total knowledge about breast cancer of (pre/ post and follow up) (n=30).

Table (4): Number and percentage distribution of the studied women of breast cancer according to their level of total FMI Tool to Measure MBIs of (pre/ post/ follow up) (N=30).

Level of total FMI Tool to Measure MBIs	Pre Program (n=30)		Post Program (n=30)		Follow Up (n=30)		Pre-Post		Pre-FU	
	No.	%	No.	%	No.	%	x^2	p-value	x^2	p-value
Low awareness (14-19)	20	66.7	0	0.0	1	3.3	56.143	<0.001**	8.571	0.016*
Moderate awareness (20-37)	10	33.3	5	16.7	7	23.3				
High awareness (38-56)	0	0.0	25	83.3	22	73.4				
Mean score ±SD	19.67±3.15		35.33±4.68		33.63±3.55					
Range	17-23		26-43		19-41					
%Percentage of change	--		79.61%		70.97%					

Table (4) reveals that there is a highly statistically significant difference between pre and post Mindfulness Based Interventions Program regarding total Mindful Attention Awareness at p-value < 0.001** which increased in post program implementation representative in High awareness (83.3%) with % of change (79.61%) while, there is statistically significant difference between post and follow up the program regarding total Mindful Attention Awareness at p-value > 0.05 which decreased in the program follow up representative in High awareness (73.4%) with % of change (70.97%).
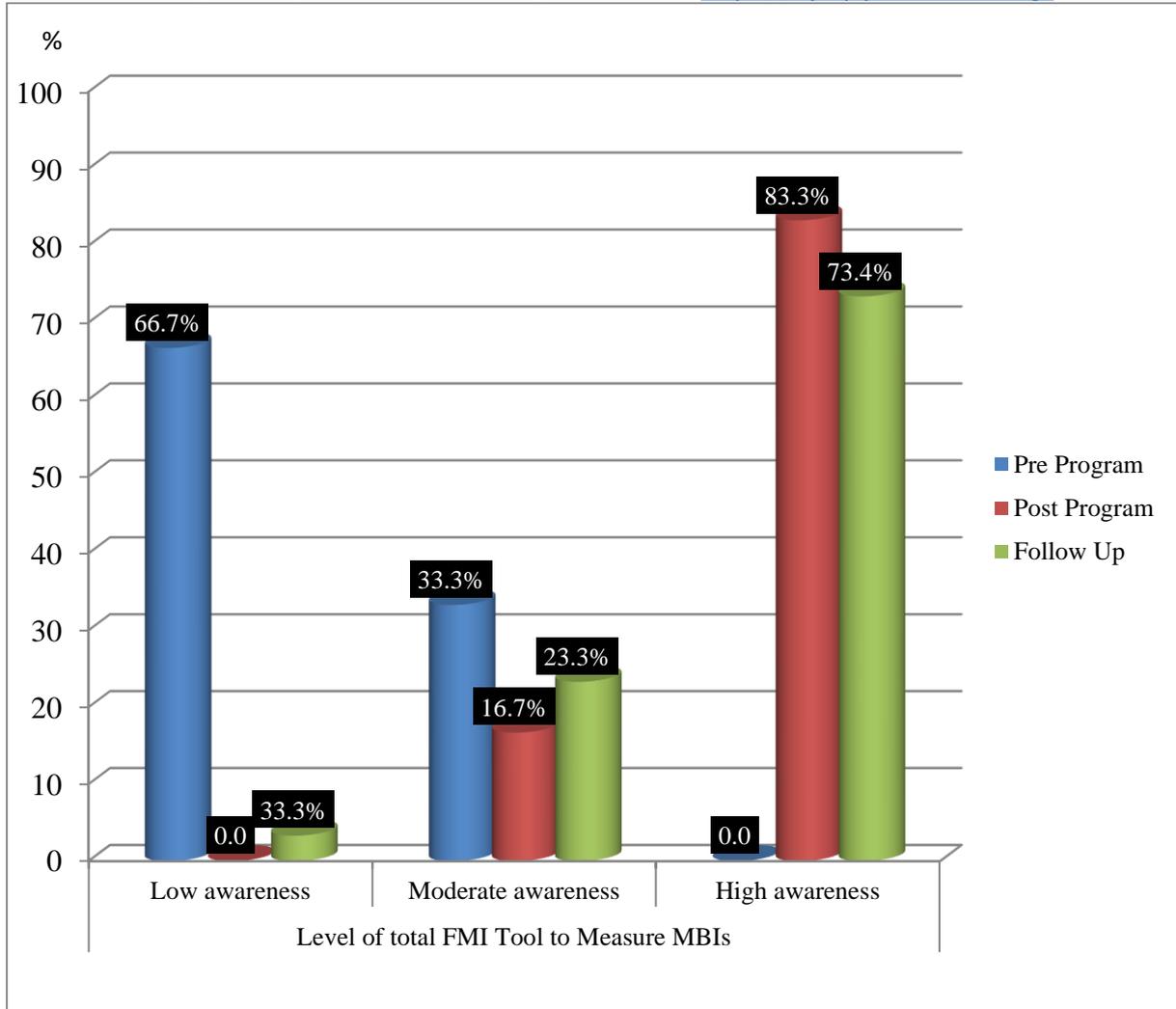
Figure (4): Percentage distribution of the studied women of breast cancer according to their level of total FMI Tool to Measure MBIs of (pre/ post/ follow up) (n=30).

Table (5): Number and percentage distribution of the studied women of breast cancer according to their level of total HARS tool to measure anxiety of (pre/ post/ follow up) (N=30).

Level of HARS tool to measure Anxiety	Pre Program (n=30)		Post Program (n=30)		Follow Up (n=30)		Pre-Post		Pre-FU	
	No.	%	No.	%	No.	%	x^2	*p-value*	x^2	*p-value*
Normal anxiety (0-14)	0	0.0	11	36.7	7	23.3				
Mild Anxiety (15-28)	4	13.3	16	53.3	16	53.3				
Moderate Anxiety (29-42)	21	70.0	3	10.0	6	20.0				
Severe Anxiety (43-56)	5	16.7	0	0.0	1	3.3	24.178	<0.001**	7.430	0.020*
Mean score ±SD	38.93±3.36		15.93±2.13		17.23±3.13					
Range	21-47		6-36		10-43					
% of change	---		59.1%		55.7%					

Table (5) reveals that there is a highly statistically significant difference between pre and post Mindfulness Based Interventions Program regarding Levels of Anxiety at p-value < 0.001** which decreased in post program implementation representative in Mild Anxiety (53.3%) with % of change (59. 1%) while, there is statistically significant difference between post and follow up the program at p-value > 0.05 which decreased in the program follow up representative in Mild Anxiety (53.3S%) with % of change (55.7%).
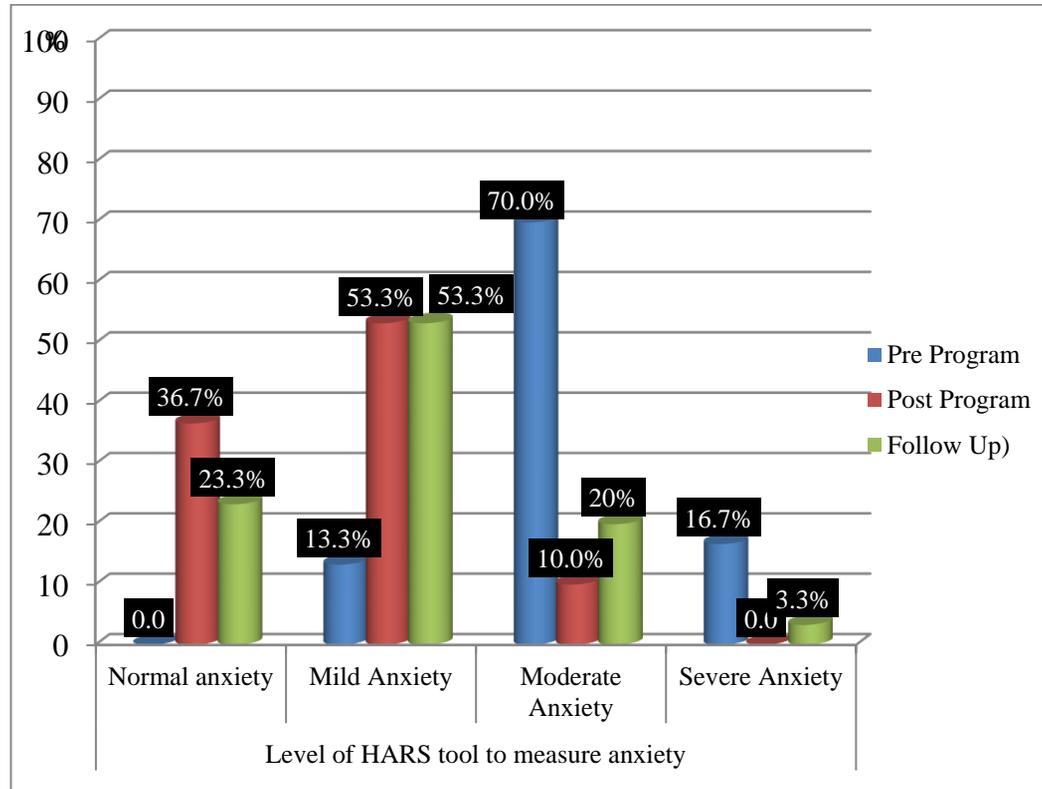
Figure (5): Percentage distribution of the studied women of breast cancer according to their level of total HARS tool to measure anxiety of (pre/ post/ follow up) (n=30).

Table (6): Correlation between total score of knowledge about breast cancer and total score of Freiburg Mindfulness Inventory (FMI) Tool to Measure MBIs and total score of HARS tool to measure anxiety in **Pre, Post, and Follow up program** (n=30).

		Total score of knowledge			Total score of FMI			Total score of Anxiety		
		Pre	Post	FU	Pre	Post	FU	Pre	Post	FU
Total score of knowledge	*r*				0.162	0.395	0.375	0.209	0.423	0.402
	p-value				0.878	0.025*	0.029*	0.657	0.024*	0.028*
Total score of FMI	*r*	0.162	0.395	0.375				0.236	0.552	0.430
	p-value	0.878	0.025*	0.029*				0.562	<0.001**	0.027*
Total score of Anxiety	*r*	0.209	0.423	0.402	0.236	0.552	0.430			
	p-value	0.657	0.024*	0.028*	0.562	<0.001**	0.027*			

Table (6) represents a positive correlation between the total score of Freiburg Mindfulness Inventory (FMI) which measure mindfulness awareness of the studied women and the total score of anxiety level during post-program implementation with (r 0.552, p-value <0.001**), while during follow up there is statistically significant correlation between them.

Discussion:

Many women with breast cancer turn to complementary therapies to deal with the symptoms of the disease. A total of 33% to 47% of women worldwide and 48% to 80% of American women make use of such therapies, and *meditation* is one of complementary alternatives that positively influences the rehabilitation by reducing pain, stress, anxiety, depression, fatigue, and even the side effects caused by drug treatments. Meditation was originally proposed by **Kabat-Zinn** and it has been successfully incorporated in a number of clinical interventions **(Del-Castanhel and Liberali, 2018).**

The current study was formulated to evaluate the effectiveness of mindfulness-based interventions for reducing anxiety among post-operative breast cancer women. Also, the researcher was hypothesized that, the mindfulness based-intervention program will have a positive effect on post-operative breast cancer women. Moreover, The study was conducted at Nasser Institute for oncology including outpatient units, total sample size was 30 of studied women.

The result was in harmony with the result of the study by **Abdelaziz et al., (2022)** who conducted the study on Egypt and studied "Relationship Between Fear, Anxiety and Chemotherapy Adherence among Patients Having Breast Cancer During COVID-19". Also, found that, the majority of patients having breast cancer aged between 30 t0 60 years and married. Also, more than have of them had a primary and secondary educational level, while, the minority of them have university educational level. Further, the majority of them were house-wife.

Breast cancer is a complex disease influenced by a combination of genetic, environmental, and lifestyle factors **(Carreira et al., 2021).** Regarding the medical history of breast cancer of the studied women, the current study results stated that, less than three quarterlies of them in the second stage of the disease, while, more than one quarter of them on the third stage of the disease. This might be related to lack of regular screenings or early detection methods like mammograms and limited access to healthcare facilities, especially in certain geographic areas or among certain socioeconomic groups, could result in delayed diagnosis and presentation at later stages of breast cancer.

The current study findings were matched with the study by **Li et al., (2021)** who conducted the study in China and studied "Retrospective study of malignant phyllodes tumors of the

breast: Younger age, prior fibroadenoma surgery, malignant heterologous elements and surgical margins may predict recurrence:. Also, reported that, more than two-third of patients hasn't heredity of breast cancer and about one quarter of them has heredity with their mothers

The present study results were in consistent with the study by **Abu Awwad et al., (2020)** who conducted the study in the United Arab Emirates. who studied "Women's Breast Cancer Knowledge and Health Communication in the United Arab Emirates". Also, who stated that, all of the studied women had source of information from social media and WhatsApp and Overall, women had positive attitudes towards breast cancer screening and breast self-examination.

Furthermore, in Egypt, President Abdel Fattah El-Sisi's Initiative for Women's Health aims to achieve early detection of breast tumors in 28 governorates. It is the result and crystallization of the services of the 100 Million Health Presidential Initiatives that started in 2019. It aims to expand the provision of public health initiative services and ensure the availability of services with the required quality for all target groups. With an emphasis on the continuity and quality of referral, diagnosis, and treatment systems (**Ministry of Health and Population, 2019**).

The current study results were supported by **Abdel Halim et al., (2021)** who conducted the study in Egypt entitled "Effect of Mindfulness-Based Program and Perceived Self-Efficacy for Patients with Lung Cancer: An Intervention Study", also, who stated that, all of the studied sample had a poor levels of total knowledge before mindfulness-based program and perceived self-efficacy for lung cancer patients intervention, while, the majority of them had average to good levels of total knowledge after mindfulness-based program and perceived self-efficacy for lung cancer patients intervention. In addition, there was a statistically significant difference between total knowledge scores among the studied sample before and after the mindfulness-based program and perceived self-efficacy for lung cancer patients

The Freiburg Mindfulness Inventory (FMI) is a well-known self-reporting questionnaire designed to measure mindfulness in individuals. The FMI has been used in various research studies to assess the impact of mindfulness-based interventions (MBIs), such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy

(MBCT), on participants' mindfulness levels. It has also been used in clinical settings to track changes in mindfulness over time and to tailor interventions to individuals' needs **(Malakoutikhah et al., 2022; Zhao et al., 2023).**

The present results were similar with the study by **Chang et al., (2023)** who conducted the study in Taiwan , entitled of "Immediate impact of Mindfulness-Based Cognitive Therapy (MBCT) among women with breast cancer: a systematic review and meta-analysis", and who revealed that, the study participant awareness level of total FMI tool to measure MBIs improved after implementation of mindfulness. Also, the results suggested that MBCT is highly beneficial as an intervention for patients who have received treatment for breast cancer.

The current study results were revealed that, there was a highly statistically significant difference between pre and post Mindfulness Based Interventions Program implementation regarding Freiburg Mindfulness Inventory which increased in two items in post program implementation representative in "Fairly often" answer like "I watch my feelings without getting lost in them" and "I am able to smile when I notice how I sometimes make life difficult". The present study results might be due to mindfulness practices have been shown to have positive effects on various cognitive and emotional aspects. These practices can lead to increased self-awareness, reduced reactivity to stressors, and improved emotional well-being.

The current study results were in the same line with **Oberoi et al., (2020)** who conducted the study in Canada, entitled of "Association of Mindfulness-Based Interventions With Anxiety Severity in Adults With Cancer", and who emphasized that, This systematic review and meta-analysis of randomized controlled trials examined the effectiveness in mindfulness-based interventions in reducing anxiety and depression in adult patients with cancer. Additionally, there was a highly statistically significant difference between pre and post Mindfulness Based Interventions Program implementation with anxiety severity in adults with cancer which increased in two items in post program implementation representative as: I watch my feelings without getting lost in them" and "I am able to smile when I notice how I sometimes make life difficult.

The current study findings were consistent with the study by **Schell et al., (2019)** who conducted the study in Germany, who studied "Mindfulness-based stress reduction for women diagnosed with breast cancer", also, who reported that, the majority of the participant patients with breast cancer anxiety levels reduced after the mindfulness-based stress intervention. Also, found evidence that MBSR probably reduces both short-term and medium-term anxiety, depression and short-term fatigue, and that it probably improves quality of sleep (moderate-certainty evidence) for breast cancer patients.

Furthermore, the present study results in harmony with the study by **Wang et al., (2022)** who conducted the study in China , entitled of "Effect of a 4-Week Internet-Delivered Mindfulness-Based Cancer Recovery Intervention on the Symptom Burden and Quality of Life of Patients With Breast Cancer" , also, who showed that, mindfulness-based had significantly larger decreases in symptom of fatigue, pain, and anxiety of the studied group burden than those in the control group. Also, mindfulness-based cancer recovery intervention on the symptom burden and quality of life of patients with breast cancer total score in the studied group had significantly decreased after the intervention and at one-month follow-up compared with the control group. Besides, the group intervention format provided a path of communication and emotional support for patients with breast cancer. Social support reportedly predicted better adjustment to cancer and better quality of life.

The current study findings in the same line with the study by **Chang et al., (2021)** who conducted the study in Taiwan, entitled of "Short-term Effects of Randomized Mindfulness-Based Intervention in Female Breast Cancer Survivors", also, who noted that, there was a statistical significance difference between total anxiety level of studied breast cancer patients according to their socio-demographic data characteristics

The use of mindfulness-based interventions (MBIs) to mitigate depression and anxiety and promote emotional and physical well-being in cancer patients has become increasingly popular **(Chayadi et al., 2022).** The current study results were indicated that, there is no statistical significance difference between total score of knowledge about breast cancer and total score of freiburg mindfulness inventory that measure mindfulness and total score of HARS that measure anxiety of studied breast cancer women in pre and follow up mindfulness program implementation.

On the other hand, there is a highly statistical significance difference between total score of Freiburg mindfulness inventory that measure mindfulness and total score of HARS that measure anxiety of studied breast cancer women in post mindfulness program implementation. From the researcher point of view, mindfulness program affect directly on the knowledge level of the studied women which reflect positively on their anxiety and stress level about their breast cancer diseases.

The results of the current study support the hypothesis that, the mindfulness based-intervention program will have a positive effect on post-operative breast cancer women. Also, the present study results accomplish the study aim to evaluate the effectiveness of mindfulness-based intervention for reducing anxiety among post-operative breast cancer women.

Conclusion:

Based on the results of the current study, it was concluded that the Mindfulness-Based Interventions mindfulness-based intervention had positive effect and significant effect in reducing anxiety among post-operative breast cancer women.

Recommendation:

In the light of the result of the current study, the following recommendations are suggested:

     1- MBIs programshould be included in the protocol of treatment as a psychological support for reducing anxiety among breast cancer women.

     2- Encourage the implementation of training programs periodically for nurses working with breast cancer women to overcome anxiety and psychological symptoms.

     3- Establish unit for complementary therapy in oncology Hospitals to deal with anxiety by applying of MBIs.

     4- Similar studies should be conducted for breast cancer and other types of cancer in different settings to generalize findings.

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