Impact of Applying Shoulder Exercises on Preventing shoulder Dysfunction among Post Operative Breast Cancer Women

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Abstract

Background: Breast cancer is one of the alarming type of cancer which affect patients physically, socially and psychologically. Mastectomy is one of the surgical procedure for managing it.Mastectomy results in shoulder stiffness and pain, thus leading to decrease musculature strength and limitation of ROM. These changes prevent post mastectomy patients from performing normal activities of daily living. **Aim:** Was to study the impact of applying shoulder exercises on preventing shoulder dysfunction among post operative breast cancer women. **Design:** a quasi-experimental study designwas used **. Setting:** The study was carried out in the surgical oncology department and surgical outpatient clinic at national Cancer Institute Cairo, Egypt. **Subjects:** A purposive sample of(60) adult female patients with breast cancer scheduled for modified radical mastectomy and were randomly and alternatively divided equally into study and control groups; (30) for each. **Tools:** Two tools were used to collect data included I: patients' Structured Interview questionnairewhich include part I patients' personal data , Part II patients' General health condition and tool II Disability of the Arm ,Shoulder and Hand (DASH questionnaire) Pre & post exercises. **Results:** 50% of the study sample had no difficulty to write and to put on pullover sweater and 63.3% of them had moderate difficulty to push open a heavy door and to do recreational activities. 53.3% of the study sample had no limited activities interference with their social activities after 4 weeks follow up and no limited stiffness in arm ,shoulder or hand post exercises and no tingling in arm, shoulder and hand . Total scores of the study group pre shoulder exercises had a highly significant correlation with total scores of the study group post and follow up shoulder exercises (P= 0.00,.002).**Conclusion:** Shoulder exercise in post mastectomy women improves upper extremity range of motion and reduces pain. Shoulder exercises were also found to improve shoulder function and upper extremity activities of daily living (ADL).**Recommendations:** Continuous education of women to do shoulder exercises which can play an important role in improving shoulder dysfunction after mastectomy. A simple illustrated booklet and posters of shoulder exercises should be developed for breast cancer patients to prevent shoulder dysfunction after mastectomy.

Key words: Breast cancer women **,** Shoulder dysfunction ,Shoulder Exercises.

Introduction:

Breast cancer is the most frequently diagnosed cancer and also the leading cause of cancer deaths among women worldwide. In order to prolong survival times, women with breast cancer usually undergo surgery (i.e., a modified radical mastectomy (MRM) or breast-conserving therapy (BCT)). **(Hui Chen et al,2020).**

Much research investigating symptom interference has been conducted in breast cancer patients, especially on the physical wellbeing and quality of life (QoL) within 15 months after a diagnosis. Commonly reported severe symptoms that interfere with patients lives include fatigue, pain, sleep disturbances, lymphedema, and arm weakness after surgery to 3 months of follow-up because of chronic and progressive swelling and recurrent skin infections.**(Bray et al,2018).**

When assessing the severity of symptoms, it is important to gauge to what extent symptoms interfere with a patient's life and QoL in order to understand how patients manage and cope with their symptoms. The ability to perform activities of daily life (ADLs) and levels of functionality are essential to determining the QoL of breast cancer survivors.

In particular, adverse effects of treatment (e.g., pain and fatigue) can interfere with one's functional capacity (FC) and directly affect one's QoL. So, persistent FC and QoL should be discussed longitudinally among breast cancer patients after surgery, especially including all activities and exercises.**(Vercelli et al ,2016).**

Prevention of loss of arm function and achieve a rapid return to an active social life after breast cancer surgery, a progressive rehabilitation program are required to maintain the flexibility and elasticity of the muscles surrounding the shoulder joint on the affected side. Progressive upper extremity exercise plays an important role in the rehabilitation of patients after modified radical mastectomy which have been reported in the literature. However, variations exist on the approach of rehabilitation (type, duration, frequency, and intensity) and indicators selected to measure the effectiveness of it**.(Ifat Klein et al,2021).**

Exercise rehabilitation can be an effective self-management strategy to control cancer treatment related symptoms and promote the QoL, including shoulder range of motion (ROM) . The benefits of shoulder-arm exercise are imperative to ameliorate the effects of surgery, chemotherapy, and radiotherapy in breast cancer patients. **(Koehler et al,2018).**

Shoulder pain is one of the most common musculoskeletal problem in post mastectomy patients . Patients are prone to develop shoulder pain due to connective tissue fibrosis of shoulder joint . The main reason behind connective tissue fibrosis is restricted shoulder joint mobility after mastectomy . Shoulder pain among post mastectomy patients is an economic burden on the health care service providers due to its high prevalence, chronic characteristics and range of therapeutic interventions . It is associated with decreased well being and are responsible for activity limitations. **(Arsh& Ullah, (2019).**

Development of arm problems and the likelihood of psychological distress due to impaired shoulder mobility and pain may remain a potential problem for patients undergoing breast cancer treatment.**(Akbas et al ,2020).**

Significance of the study:

Breast cancer (BC) is the most frequent malignancy among women worldwide . Surgery is a central component of primary BC management, and axillary surgery is often necessary. Breast cancer surgeries can cause a variety of adverse effects, ranging from restriction in function and range of motion (ROM) to emotional difficulties. Persistent pain is reported by 20-68 % of the patients, especially after axillary lymph node dissection (ALND), with additional risk factors including young age, the severity of acute postoperative pain, chemotherapy, and radiation. **(Habib et al, 2019).**

Functional disability and decreased ROM are common side effects after BC surgery and treatments, reported by 10-60 % of patients, and may last for years after recovery. Long-term shoulder impairments are most often caused by lymph node dissection, mastectomy procedure, positive nodes, and older age . Shoulder morbidity is a major factor in the need for multiple sick days and delayed return to work, reduced daily activities, and poorer quality of life .**(De Groef et al, 2019).**

Physical therapy (PT) can help to reduce pain, fatigue, and symptoms of oncologic treatments and promote quality of life, physical functioning and ROM, throughout the recovery process. Pain education and exercise have been suggested as effective in reducing postoperative pain . Although there is evidence regarding the effectiveness of early PT, surgeons still refrain from referring to PT as it may lead to increased bleeding, seroma (fluid accumulation in the tissue), and lymphedema (chronic edema) . It is arising the discussion when it is the right time to start PT and exercises .**(Wilson, 2017).**

Aim of the study:

The study aimed to determine the impact of applying shoulder exercises on preventing shoulder dysfunction among post operative breast cancer women through:

1-Assess the shoulder range of motion of post mastectomy women before shoulder exercises .

2- Implement an arm, shoulder and hand exercises for participants .

3- Evaluate the effectiveness of practicing arm, shoulder and hand exercises on improving shoulder function and preventing shoulder dysfunction .

Hypotheses:

The following research hypotheses were formulated to fulfill the aim of the study

·H1: Shoulder dysfunction of women in the study group will decrease than that in females in the control group.

H2:Shoulder range of motion of women in the study group will improve than that in females in the control group.

Subjects and methods:

Design: The study was utilized a quasi-experimental study design. This design is similar to randomized controlled trial in many aspects, but there are many challenges in designing and conducting a quasi experiment when internal validity threats are introduced from the absence of randomization**(Matthew & Maciejewsk,2018).**

Setting: The study was carried out in the surgical oncology department in the third floor and surgical outpatient clinic in the first floor at National Cancer Institute Cairo, Egypt.

Subjects: A purposive sample of (60)adult female patients with breast cancer scheduled for modified radical mastectomy and were randomly and alternatively divided equally into study and control groups; (30) for each.

The inclusion criteria were:

1- Scheduled for modified radical mastectomy.

2- Aged between 20 and 60 years.

The exclusion criteria were:

Patients with diabetes, pre-existing joint disorder (Rheumatoid arthritis etc.), previous surgery on the chest wall, shoulder, arm, patients with visual problems and patients with psychiatric problems were excluded from the study.

Data collection tools: Two tools were used to collect data:

-The first tool: Patients' StructuredInterview questionnaire: It consisted of **two parts part I patients' personal data** such as age, Marital status and educational level, residence and occupation .

Part II:: **Patients general health condition**: It used to assess general patients condition which include diagnosis, previous history of breast cancer , presence of chronic disease, smoking, Menopause history.

Scoring system: Questions were scored one for yes ,and zero for no.

Tool II: Disability of the Arm, Shoulder and Hand (DASH questionnaire) Pre , post and follow up exercises. The main part of the DASH is a 34-item disability/symptom scale concerning the patient's health status during the preceding week. The items ask about the degree of difficulty in performing different physical activities because of the arm, shoulder, or hand problem (21 items), the severity of each of the symptoms of pain, activity-related pain, tingling, weakness and stiffness (5 items), as well as the problem's impact on social activities, work, sleep, and self-image (8 items). Each item has five response options. No difficulty =1,mild difficulty=2, moderate difficulty =3,severe difficulty =4,and unable =5 The scores for all items are 100**,** then used to calculate a scale score ranging from 0 (no disability) to 100 (most severe disability). The score for the disability/symptom scale is called the DASH score.

Validity:

The validity of the tools were tested by offered to 5 academic expertise of adult nursing (medical surgical nursing) from the Faculty of Nursing. To determine relevance, clarity, completeness and comprehensiveness of the tools, experts responses were either agree or disagree for the face validity. Then their

opinions are reviewed and final questionnaire were prepared and used.

Reliability:

Testing reliability of the proposed tools was done statistically by cronbach's alpha test. The coefficient alpha for (DASH) questionnaire was (0.86), that mean the internal consistency was good.

Pilot Study:

A pilot study was carried out on 10% of sample size, involving (6) patients to evaluate the efficiency, reliability, clarity and applicability of the tools, then the tools were adapted according to the pilot study results. Subjects included in the pilot study not excluded from the total sample as no modification of study tools were done.

Field work:

After obtaining official permission to carry out the study. The researchers were introduced themselves to the patients and explained the purpose of the study. The written consent was obtained from the participants. The data collection of the study was covered a period of six months from beginning of November 2022and to the end of April 2023 in the previously mentioned settings, and the researchers were available in the study settings 3 days/week from 9.00 a.m. to 1.00 p.m. The structured interview questionnaire took about 25 minutes to be filled. Post-test were conducted at the end of the exercises training.

The shoulder Exercises were done in four phases:

Assessment phase: The researchers interviewed each subject individually and clarified the aim of the study, then asked for participation. They met the subject's and filled the questionnaire to evaluate their symptoms and to collect personal data and assess patient condition. The data that was obtained during this phase was considered the basis for the training exercises (pre-test).

Planning phase: After identified the patient condition and symptoms the training exercises were explained by the researchers, based on the assessment phase results. It was designed to improve subject's shoulder function and strengthen the arm muscles.

Implementation phase: A combined Aerobic and Resistance Exercises (CARE) are used with hand, shoulder and arm exercises to increase muscle strength and physical functioning . The training of shoulder exercises explained in simple Arabic language to be appropriate for subject's understanding**.** The exercises were done first by the researchers and asked the subject to do it in front of the researchers to assert the accuracy of doing the exercises; the session for application part took about 30 minutes. The training exercises were executed in 2 months given in an average for three days per week. The exercises are illustrated in simple booklet by Arabic language given to the participants during sessions and given to the control group at the end of the study.

Evaluation phase: The evaluation was assessed after 4 weeks through posttest using the same format of pretest tools and follow up after another 4 weeks . The researchers explained the exercises to the control group after finishing the study and they had the freedom to apply it or not if they wanted it.

Administrative Design: The present study was carried out after taking an official permission from the administrators of the study setting at national cancer institute and outpatient clinic by presented of an official letter taken from the Faculty of Nursing, Helwan University, after the aim of the study was explained clearly. The study was approved by the ethical committee of Faculty of Nursing, Helwan University (N0.31) by date 19-10-2022.

Ethical considerations:

The ethical research consideration in this study was including the following:

- The researchers explain the objective and aim of the study to the subjects who agreed to participate in the study.
- Subjects were informed that they are allowed to choose to participate or not in the

research and that they have the right to withdraw from the research at any time.

Statistical analysis:

All statistical analyses were performed using SPSS. Data were tested for normality of distribution prior to any calculations. Continuous data were normally distribute and were expressed in mean ±standard deviation (SD). Categorical data were expressed in number and percentage. Statistical significance was set at $p<0.05$.

Results

Table(1) shows that, in the study group. 40% of them were between age 45to more than 55years old and 36.7% were between age 35 to less than 45 years old with a mean age 36.4±.7.7. In relation to education level, 40% of the study sample were diploma, 30% of them can read and write. In relation to marital status, 53.4% of them were married .In relation to occupation, 60% of them were housewives and they live in rural area and 53.3% of them are married**.**

In the control group, 46.7% of them were between age 35 to less than 45 years old and33.3% were between age 45and more than 55 years old with mean age 35.7±.7.8. In relation to educational level, 40% of the control group were diploma, 33.3% of them can read and write .In relation to marital status, 36.7% of them were married and 23.3% were divorced. In relation to occupation, 50% of them were employed housewives. In relation to their residence,56.7% of the control group live in rural area and 36.6% of tem are married.

Table(2) reveals that, in the study group, 50% of them had breast tumor in Rt. Side and exposed to smoking , 56.7% of them had family member suffering from breast cancer and the same percentage of them eat food contains fiber and high protein . As regards Age of Menarche, 63.3% of them had menarche at age 12 years and over. In relation to Menopause, 60% of them had menopause and the same percentage had their first pregnancy at age from 20 to 30 years. In relation to breast feeding, 66.7% of them practice breast feeding and 73.3% of them took oral contraceptives,70% of them not expose to radiation**.**

In relation to control group,63.3% of them had breast tumor in Rt. side, while 46.7% of them had family member suffering from breast cancer and the same percentage had menarche at age 12 years or less. As regards to breast feeding, 66.7% of them practice breast feeding and 60 % of them took oral contraceptive.76.7% of them did not expose to radiation or smoking.

Table(3) illustrates that the activities in last week and the ability of each patient in the two groups to do it. In relation to the study group, 40% of them had moderate difficulty to open a new jar or to write. While 60% of them had moderate difficulty to push open a heavy door and to carry a shopping bag or briefcase.66.7% of them found severe difficulty to wash or blow dry their hair and 46.7% of them were unable to do recreational activity and move their arm freely.

In relation to control group, 56.7% of them had mild difficulty to write, 60% of them found mild difficulty to prepare a meal.56.7% of them found moderate difficulty to carry a shopping bag or briefcase. 50% of them were unable to wash their back and the same percentage had moderate difficulty to do recreational activities that require little effort and to do sexual activities.

Table(4) explains that, 43.3% of the study group had very limited movement of their arm, shoulder and hand and this interfere with their normal social relation and activities during the past week while 43.3% of them were unable to do regular daily activities because of arm or shoulder problem. in relation to pain, 60% of the study group had severe pain and weakness in their arm, shoulder and hand.

In relation to the control group, 66.6% of them had pain when performed any specific activity and arm, shoulder, or hand problem interfered with their normal social activities with family ,friends, neighbors or groups.

Table(5) reveals that, 43.3% of the study patients found so much difficulty to sleep because of arm ,shoulder or hand pain while 40% of them felt severe less confident and less useful . In relation to the control group, 46.7% of them had severe difficulty to sleep and 36.7% of them had extreme feeling of less confident or less useful because of arm, shoulder or hand problem.

Table(6) illustrates that , 50% of the study patients had severe or moderate difficulty to do usual technique for work and 53.3% of them were unable to do usual work and the same percentage found severe difficulty to spending usual amount of time doing work.

Table **(7)** reveals that,50% of the study patients had no difficulty to write and to Put on pullover sweater and 63.3% of them had moderate difficulty to Push open a heavy door and to do recreational activities.

This table also shows that after 4 weeks of practicing shoulder exercises, most of percentages improved more than in the post results.

Table(8)explains that,53.3% of the study sample had no limited activities interference with their social activities after 4 weeks follow up and no limited stiffness in arm ,shoulder or hand post exercises with the same percentage 53.3%and tingling in arm, shoulder and hand had mild limitation of the movement with percentage of 53.3% post and follow up of the exercises.

This table also shows that after 4 weeks of practicing shoulder exercises, most of percentages improved more than in the post results

Table (9)This table illustrates that, 46.7% of the study sample had mild difficulty to fall sleep because of pain in arm, shoulder and hand.36.7% of the study sample had mild or moderate feeling of less confident or less useful because of arm, shoulder or hand problem.

Table(10) shows that, 53.3% of the study sample feels no difficulty to using usual technique for work or to spending usual amount of time doing work post exercises but 66.7 % of them feels moderate difficulty to do work as well as would like post exercises.

Table (11) shows that, total score of the study group pre shoulder exercises had a highly statistically significant correlation with total score of the study group post and follow up shoulder exercises (P= 0.00,.002).

Table (1): Frequency and percentage distribution for both study and control group regarding personal data (n=60):

Items	Study (n=30)		Control (n=30)	
Age/Years				
Mean± SD	36.4±.7.7		35.7±.7.8	
Range	25->55		25->55	
	N	%	N	%
Age Category				
25-<35y	7	23.3	6	20
35- <45y	11	36.7	14	46.7
45->55y	12	40	10	33.3
Educational level				
Not read and write	4	13.3	8	26.7
Read & write	9	30.0	10	33.3
Diploma	12	40.0	12	40.0
University	5	16.7	0	0.0
Occupation				
Employed	12	40.0	15	50.0
Housewife	18	60.0	15	50.0
Residence				
Rural	18	60.0	17	56.7
Urban	12	40.0	13	43.3
Marital Status				
Single	6	20	7	23.33
Married	16	53.33	11	36.67
Divorced	4	13.33	7	23.33
Widow	4	13.33	5	16.67

Table (2) Frequency and percentage distribution of the study and control group regarding general health condition(n=30 for each group).

Items	Study (n=30)		Control (n=30)	
	N	%	N	%
Side of breast tumor				
Rt .breast	15	50.0	19	63.3
Lt. breast	15	50.0	11	36.7
Family member suffering from breast cancer				
Yes	17	56.7	14	46.7
No	13	43.3	16	53.3
Relative relationship				
Mother	8	26.7	5	16.7
Offspring's	2	6.7	4	13.3
Sister	7	23.3	5	16.7
No family member	13	43.3	16	53.3
Age of Menarche				
Less than 12years	11	36.7	14	46.7
12 years and over	19	63.3	16	53.3
Menopause				
Yes	12	40	15	50
No	18	60	15	50
Age of first pregnancy				
Less than 20 y	6	20	6	20
From 20 to 30 y	18	60	16	53.3
More than 30 y	6	20	8	26.7
Breast Feeding				
Yes	20	66.7	20	66.7
No	10	33.3	10	33.3
Use of oral Contraceptive				
Yes	22	73.3	18	60
No	8	26.7	12	40
Expose to radiation				
Yes	9	30	7	23.3
No	21	70	23	76.7
Expose to Smoking				
Yes	15	50	7	23.3
No	15	50	23	76.7

Table(3): Comparison between the two study groups pre the shoulder exercises regarding Disability of the Arm, Shoulder and Hand(DASH) in relation to different physical activities: (n=30 for each group).

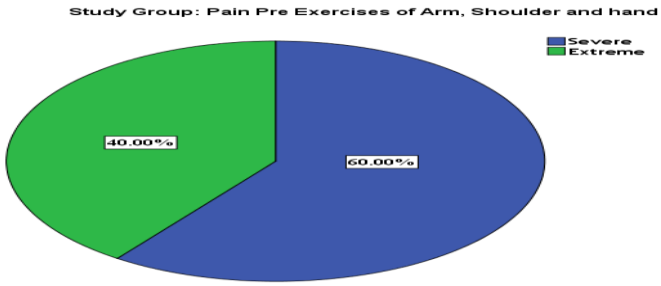
Activities	Pre shoulder Exercises									
	No Difficulty(1)		Mild difficulty(2)		Moderate difficulty(3)		Severe difficulty(4)		Unable (5)	
	N	%	N	%	N	%	N	%	N	%
Open a tight or new jar										
Study group	-	-	-	-	12	40	11	36.7	7	23.3
Control group	10	33.3	9	30	9	30	-	-	-	-
Write										
Study group	7	23.3	11	36.7	12	40	-	-	-	-
Control group	13	43.3	17	56.7	-	-	-	-	-	-
Turn a key										
Study group	5	16.7	11	36.7	14	46.7	-	-	-	-
Control group	15	50	14	46.7	1	3.3	-	-	-	-
Prepare a meal										
Study group	-	-	-	-	10	33.3	12	40	8	26.7
Control group	2	6.7	18	60	10	33.3	-	-	-	-
Push open a heavy door										
Study group	-	-	-	-	18	60	12	40	-	-
Control group	8	26.7	13	43.3	9	30	-	-	-	-
Place an object on a shelf above your head										
Study group	-	-	-	-	11	36.7	10	33.3	9	30
Control group	-	-	13	43.3	13	43.3	4	13.3	-	-
Do heavy household chores (e.g Wash walls, wash floors)										
Study group	-	-	-	-	-	-	17	56.7	13	43.3
Control group	-	-	-	-	12	40	12	40	6	20
Garden or do yard work										
Study group	-	-	-	-	-	-	15	50	15	50
Control group	-	-	9	30	20	66.7	1	1	-	-
Make a bed										
Study group	-	-	-	-	16	53.3	14	46.7	-	-
Control group	7	23.3	11	36.7	12	40	-	-	-	-
Carry a shopping bag or briefcase	-	-	-	-	18	60	12	40	-	-
Study group	8	26.7	17	56.7	5	16.7	-	-	-	-
Control group										
Carry a heavy object (over 10Ibs)										
Study group	-	-	-	-	-	-	17	56.7	13	43.3
Control group	-	-	-	-	14	46.7	16	53.3	-	-

Change a light bulb overhead	-	-	-	-	-	-	16	53.3	14	46.7
Study group	-	-	-	-	-	-	16	53.3	14	46.7
Control group										
Wash or blow dry hair										
Study group	-	-	-	-	-	-	20	66.7	10	33.3
Control group	3	10	13	43.3	14	46.7	-	-	-	-
Wash your back										
Study group	-	-	-	-	-	-	9	30	21	70
Control group	-	-	-	-	-	-	15	50	15	50
Put on pullover sweater										
Study group	-	-	-	-	10	33.3	14	46.7	6	20
Control group	11	36.7	10	33.3	9	30	-	-	-	-
Use a knife to cut food										
Study group	-	-	-	-	11	36.7	11	36.7	8	26.7
Control group	1	3.3	16	53.3	13	43.3		-	-	-
Recreational activities which require little effort(e.g card playing , knitting ,etc--)										
Study group	-	-	-	-	17	56.7	7	23.3	6	20
Control group	-	-	14	46.7	15	50	1	3.3	-	-
Recreational activities in which you take some force or impact through arm, shoulder or hand (e.g golf ,hammering ,tennis ,etc..)										
Study group	-	-	-	-	-	-	19	63.3	11	36.7
Control group	-	-	-	-	-	-	13	43.3	17	56.7
Recreational activities in which you move arm freely(e.g playing frees by ,badminton, etc…)										
Study group	-	-	-	-	-	-	16	53.3	14	46.7
Control group	-	-	-	-	7	23.4	13	43.3	10	33.3
Manage transportation needs(getting from one place to another)										
Study group	-	-	-	-	13	43.3	13	43.3	4	13.3
Control group	-	-	-	-	10	33.3	12	40	8	26.7
Sexual activities										
Study group	-	-	-	-	13	43.3	13	43.3	4	13.3
Control group	-	-	-	-	15	50	8	26.7	7	23.4

Table(4): Comparison between the two study groups pre shoulder exercises regarding Disability of the Arm, Shoulder and Hand(DASH) related to severity of symptoms and pain during the past week : (n=30 for each group).

Items	Pre shoulder Exercise									
	No limited at all (1)/ None		Slightly limited (2)/Mild		Moderately limited(3)/Moderate		Very limited(4) /Severe		Unable (5)/ Extreme	
	N	%	N	%	N	%	N	%	N	%
During the past week to what extent has arm, shoulder, or hand problem interfered with normal social activities with family ,friends, neighbors or groups?										
Study group	-	-	-	-	9	14.5	13	43.3	8	26.7
Control group	-	-	-	-	10	33.3	20	66.6	-	-
During the past week, were limited in work or other regular daily activities as a result of arm ,shoulder ,or hand problem?										
Study group	-	-	-	-	-	-	17	56.7	13	43.3
Control group	-	-	-	-	16	53.3	10	33.3	4	13.3
Arm ,Shoulder or hand pain										
Study group	-	-	-	-	-	-	18	60	12	40
Control group	-	-	-	-	5	16.7	14	46.6	11	36.6
Arm ,Shoulder or hand pain when performed any specific activity										
Study group	-	-	-	-	-	-	19	30.6	11	36.7
Control group	-	-	-	-	-	-	10	33.3	20	66.6
Tingling(Pins and needles) in arm shoulder or hand.										
Study group	-	-	-	-	9	30	10	33.3	11	36.7
Control group	-	-	-	-	8	26.7	12	40	10	33.3
Weakness in arm ,shoulder or arm										
Study group	-	-	-	-	-	-	18	60	12	40
Control group	-	-	-	-	6	17	8	26.7	16	53.3
Stiffness in arm, shoulder, or hand										
Study group	-	-	-	-	9	30	13	43.3	8	26.7
Control group	-	-	-	-	17	56.7	10	33.3	3	10

Figure (1) Pain pre shoulder exercises of the study group



Table(5): Comparison between the two study groups pre shoulder exercises regarding Disability of the Arm, Shoulder and Hand(DASH) in relation to the problem's impact on social activities: (n=30 for each group).

Items	Pre shoulder Exercise									
	No difficulty (1)/ None		Mild difficulty (2)/Mild		Moderate difficulty 3)/Moderate		Severe difficulty(4) /Severe		So much difficulty that I can't sleep (5)/ Extreme	
	N	%	N	%	N	%	N	%	N	%
During the past week ,how much difficulty have you had sleeping because of the pain in arm, shoulder, or hand										
Study group	-	-	-	-	5	16.7	12	40	13	43.3
Control group	-	-	-	-	11	36.7	14	46.7	5	16.7
feel less capable, less confident or less useful because of arm, shoulder, or hand problem.										
Study group	-	-	-	-	10	33.3	12	40	8	26.7
Control group	-	-	-	-	8	26.7	11	36.7	11	36.7

Table(6): Comparison between the two study groups pre shoulder exercises regarding Disability of the Arm, Shoulder and Hand(DASH) related to the ability to work. (n=30 for each group).

Items	Pre shoulder Exercise									
	No difficulty (1)		Mild difficulty (2)		Moderate difficulty (3)		Severe difficulty(4)		unable (5)	
	N	%	N	%	N	%	N	%	N	%
Using usual technique for work	-	-	-	-	15	50	15	50	-	-
Study group	-	-	12	40	12	40	6	20	-	-
Control group										
Doing usual work because of arm, shoulder, or hand pain										
Study group	-	-	-	-	-	-	14	46.7	16	53.3
Control group	-	-	-	-	11	36.7	13	43.3	6	20
Doing work as well as would like										
Study group	-	-	-	-	-	-	20	66.7	10	33.3
Control group	-	-	8	26.7	12	40	10	33.3	-	-
Spending usual amount of time doing work										
Study group	-	-	-	-	-	-	16	53.3	14	46.7
Control group	-	-	-	-	-	-	17	56.7	13	43.3

Table(7) Comparison between the study group post and follow up(4 weeks) after practicing the shoulder exercises in relation to physical activities (n=30).

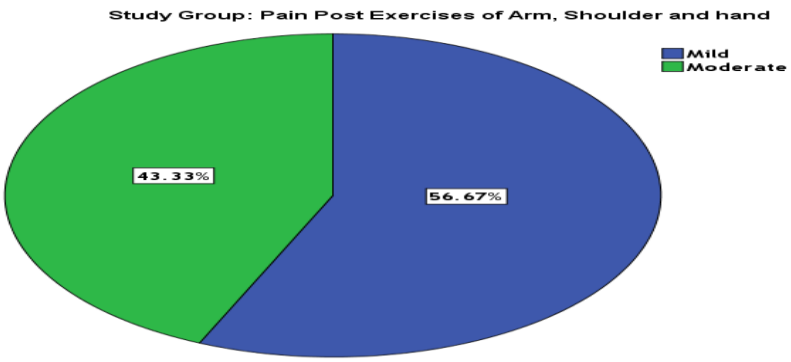
Activities	Study group Post & follow up shoulder Exercises									
	No Difficulty(1)		Mild difficulty(2)		Moderate difficulty(3)		Severe difficulty(4)		Unable (5)	
	N	%	N	%	N	%	N	%	N	%
Open a tight or new jar										
Post	-	-	8	26.7	15	50	7	23.3	-	-
Follow up	11	36.7	11	36.7	8	26.7	-	-	-	-
Write										
Post	-	-	11	36.7	19	63.3	-	-	-	-
Follow up	15	**50**	11	36.7	4	6.5	-	-	-	-
Turn a key										
Post	-	-	12	40	14	46.7	4	13.3	-	-
Follow up	14	46.7	10	33.3	6	20	-	-	-	-
Prepare a meal										
Post	9	30	16	53.3	5	16.7	-	-	-	-
Follow up	11	36.7	16	53.3	3	10	-	-	-	-
Push open a heavy door										
Post	-	-	4	13.3	19	**63.3**	7	23.3	-	-
Follow up	16	53.3	9	30	5	16.7	-	-	-	-
Place an object on a shelf above your head										
Post	-	-	7	23.3	13	43.3	10	33.3	-	-
Follow up	10	33.3	16	53.3	4	13.3	-	-	-	-
Do heavy household chores (e.gWash walls, wash floors)										
Post	-	-	8	26.7	15	50	7	23.3	-	-
Follow up	11	36.7	11	36.7	8	26.7	-	-	-	-
Garden or do yard work										
Post	-	-	12	40	14	46.7	4	13.3	-	-
Follow up	14	46.7	10	33.3	6	20	-	-	-	-
Make a bed										
Post	-	-	4	13.3	19	63.3	7	23.3	-	-
Follow up	16	53.3	9	30	5	16.7	-	-	-	-
Carry a shopping bag or briefcase										
Post	-	-	11	36.7	19	63.3	-	-	-	-
Follow up	15	50	11	36.7	4	6.5	-	-	-	-
Carry a heavy object (over 10Ibs)										
Post	-	-	7	23.3	13	43.3	10	33.3	-	-
Follow up	10	33.3	16	53.3	4	13.3	-	-	-	-
Change a light bulb overhead										
Post	-	-	4	13.3	16	53.3	10	33.3	-	-
Follow up	9	30	17	56.7	4	13.3	-	-	-	-

Wash or blow dry hair										
Post	-	-	12	40	14	46.7	4	13.3	-	-
Follow up	14	46.7	10	33.3	6	20	-	-	-	-
Wash your back										
Post	-	-	4	13.3	19	63.3	7	23.3	-	-
Follow up	16	53.3	9	30	5	16.7	-	-	-	-
Put on pullover sweater										
Post	-	-	11	36.7	19	63.3	-	-	-	-
Follow up	15	**50**	11	36.7	4	6.5	-	-	-	-
Use a knife to cut food										
Post	-	-	4	13.3	16	53.3	10	33.3	-	-
Follow up	9	30	17	56.7	4	13.3	-	-	-	-
Recreational activities which require little effort(e.g card playing , knitting ,etc--)										
Post										
Follow up	9	30	16	53.3	5	16.7	-	-	-	-
	11	36.7	16	53.3	3	10	-	-	-	-
Recreational activities in which you take some force or impact through arm, shoulder or hand (e.g golf ,hammering ,tennis ,etc..)										
Post	-	-	12	40	14	46.7	4	13.3	-	-
Follow up	14	46.7	10	33.3	6	20	-	-	-	-
Recreational activities in which you move arm freely(e.g playing frees by ,badminton, etc…)										
Post										
Follow up	-	-	4	13.3	19	63.3	7	23.3	-	-
	16	53.3	9	30	5	16.7	-	-	-	-
Manage transportation needs(getting from one place to another)										
Post	-	-	11	36.7	19	63.3	-	-	-	-
Follow up	15	50	11	36.7	4	6.5	-	-	-	-
Sexual activities										
Post	9	30	16	53.3	5	16.7	-	-	-	-
Follow up	11	36.7	16	53.3	3	10	-	-	-	-

Table(8) Comparison between the study group post and follow up(4 weeks) after practicing the shoulder exercises in relation to severity of symptoms and pain (n=30).

Items	Study group Post & follow up shoulder Exercises									
	No limited at all (1)/ None		Slightly limited (2)/Mild		Moderately limited(3)/Moderate		Very limited(4) /Severe		Unable (5)/ Extreme	
	N	%	N	%	N	%	N	%	N	%
During the past week to what extent has arm, shoulder, or hand problem interfered with normal social activities with family ,friends, neighbors or groups?										
Post	-	-	4	13.3	19	63.3	7	23.3	-	-
Follow up	16	**53.3**	9	30	5	16.7	-	-	-	-
During the past week, were limited in work or other regular daily activities as a result of arm ,shoulder ,or hand problem?										
Post										
Follow up	-	-	7	23.3	13	43.3	10	33.3	-	-
	10	33.3	16	**53.3**	4	13.3	-	-	-	-
Arm ,Shoulder or hand pain										
Post	-	-	17	56.6	13	43.3	-	-	-	-
Follow up	13	43.3	12	40	5	16.7	-	-	-	-
Arm ,Shoulder or hand pain when performed any specific activity										
Post	-	-	12	40	14	46.7	4	13.3	-	-
Follow up	14	46.7	10	33.3	6	20	-	-	-	-
Tingling(Pins and needles) in arm shoulder or hand.										
Post	9	30	16	**53.3**	5	16.7	-	-	-	-
Follow up	11	36.7	16	**53.3**	3	10	-	-	-	-
Weakness in arm ,shoulder or arm										
Post	-	-	11	36.7	19	63.3	-	-	-	-
Follow up	15	50	11	36.7	4	6.5	-	-	-	-
Stiffness in arm, shoulder, or hand										
Post	16	**53.3**	-	-	14	46.7	-	-	-	-
Follow up	6	20	11	36.7	13	43.3	-	-	-	-

Figure (2) Pain post shoulder exercises of the study group



Table(9) Comparison between the study group post and follow up(4 weeks) after practicing the shoulder exercises in relation to sleeping and confidence (n=30):

Items	Study group Post & follow up shoulder Exercises									
	No difficulty (1)/ None		Mild difficulty (2)/Mild		Moderate difficulty 3)/Moderate		Severe difficulty(4) /Severe		So much difficulty that I can't sleep (5)/ Extreme	
	N	%	N	%	N	%	N	%	N	%
During the past week ,how much difficulty have you had sleeping because of the pain in arm, shoulder, or hand										
Post	5	16.7	12	40	13	43.3	5	-	-	-
Follow up	11	36.7	14	**46.7**	5	16.7	11	-	-	-
feel less capable, less confident or less useful because of arm, shoulder, or hand problem.										
Post	10	33.3	12	40	8	26.7	10	-	-	-
Follow up	8	26.7	11	**36.7**	11	**36.7**	8	-	-	-

Table(10) Comparison between the study group post and follow up(4 weeks) after practicing the shoulder exercises in relation to ability to work (n=30).

Items	Study group Post & follow up shoulder Exercises									
	No difficulty (1)		Mild difficulty (2)		Moderate difficulty (3)		Severe difficulty(4)		unable (5)	
	N	%	N	%	N	%	N	%	N	%
Using usual technique for work										
Post	-	-	15	50	15	50	-	-	-	-
Follow up	12	40	12	40	6	20	-	-	-	-
Doing usual work because of arm, shoulder, or hand pain										
Post	16	**53.3**	-	-	14	46.7	-	-	-	-
Follow up	6	20	11	36.7	13	43.3	-	-	-	-
Doing work as well as would you like										
Post	10	33.3	-	-	20	**66.7**			-	-
Follow up	8	26.7	12	40	10	33.3			-	-
Spending usual amount of time doing work										
Post	16	**53.3**	14	46.7	-	-	-	-	-	-
Follow up	17	56.7	13	43.3	-	-	-	-	-	-

Table (11) Correlation between the two studied groups in relation to total score of interview questionnaire and DASH..

Correlations	Total score control group	Total score study group pre exercises	Total score study group post exercises	Total score study group follow up exercises
Total score of the control group	1.00	.227 .276	.289 .160	.179 .393
Total score of the study group pre exercises	.227 .276	1.00	.680** .000	.598** .002
Total score of the study group post exercises	.289 .160	.680** .000	1.00	.372 .067
Total score of the study group follow up exercises	.179 .393	.598** .002	.372 .067	1.00

****Significant at p≤0.05**

Discussion

Shoulder pain and shoulder function impairment are common complaints of women treated for breast cancer (BC) that can persist for up to six years after surgery . Following BC surgery, 25% to 60% of patients present persistent pain, and 35% of women experience different levels of moderate arm/shoulder pain in the first six months following breast surgery. At present, shoulder pain and disability is recognized as an important post-operative factor that affects QoL in women undergoing BC surgery.**(Beyaz et al (2016**).

The results of the current study revealed that, the study group ,two fifth of them were between age 45to more than 55years old and about one third were between age 35 to less than 45 years old with a mean age 2.33±1.02 years old. In relation to the educational level, two fifth of the study sample were diploma, and about one third of them can read and write .Regarding to marital status, more than half of them were married .Concerning to occupation, about two thirds of them were housewives and they live in rural area. Also half of them had breast tumor in Rt. Side and exposed to smoking , more than half of them had family member suffering from breast cancer and the same percentage of them eat food contains fiber and high protein .

As regards Age of Menarche, about two thirds of them had menarche at age 12 years and over. In relation to Menopause, less than two thirds of them had menopause and the same percentage had their first pregnancy at age from 20 to 30 years. In relation to breast feeding, two thirds of them practice breast feeding and about three quarters of them took oral contraceptives and more than two thirds of them not expose to radiation**.**

Arsh& Ullah,2(2019).reported in their study that , total of 127 post mastectomy patients participated in the study. The mean age of the participants was 34.69 ± 6.76 years. About half of participants (n = 68, 53.5 %) underwent right mastectomy and 59 (46.5 %) underwent left mastectomy. Majority (n = 104, 81.8 %) of the patients were married while, 23 (18.1 %) were single/ divorced. 81 (63.8 %) patients were uneducated while, remaining 46 (36.2 %) were educated. 89 (70.1 %) of the patients were house wives, 20 (15.7 %) were office workers and 18 (14.2 %) were having other professions. Out of total 127 participants, 99 (77.95 %) reported shoulder pain and disability on operated site.

In relation to patients activities , the current study illustrated that the activities in last week and the ability of each patient in the two groups to do it. In relation to the study group, two fifth of them had moderate difficulty to open a new jar or to write. While, less than two thirds of them found moderate difficulty to push or open a heavy door and to carry a shopping bag or briefcase. Two thirds

of them had severe difficulty to wash or blow dry their hair and more than two fifth of them were unable to do recreational activity and move their arm freely.

In relation to control group, more than half of them found mild difficulty to write, less than two fifth of them had mild difficulty to prepare a meal .More than half of them had moderate difficulty to carry a shopping bag or briefcase. Half of them were unable to wash their back and the same percentage found moderate difficulty to do recreational activities that require little effort and to do sexual activities.

Levy et al (2015). Mentioned that,the most frequently documented impairments after breast cancer treatment are reduction in range of motion of the shoulder (51%), pain (51%), reduced grip strength (33%), and lymphedema (36%). Optimal arm functioning is vital for independence, return to work, performance of household chores and overall quality of life. Six years following treatment, upper extremity impairments continue to be evident, having a significant impact on quality of life and precluding full resumption of activities of daily living. greater than 35% of breast cancer survivors report limitations in performing household chores and carrying or lifting items, thus limiting their ability to perform normal activities of daily living

The current study revealed that half of the studied sample had no difficulty to write and to put on pullover sweater and about two thirds of them had moderate difficulty to push or open a heavy door and to do recreational activities post exercises. More than half of the study sample had no limited activities interference with their social activities after 4 weeks follow up and no limited stiffness in arm ,shoulder or hand post exercises and no tingling in arm, shoulder and hand. It also showed that after 4 weeks of practicing shoulder exercises, most of percentages improved more than in the post results.

Shoe et al (2021), asserted that it is recommended that postoperative physical therapy should begin the first day following surgery ,gentle ROM exercises should be initiated in the first week after surgery, and the resistive exercises can be started with light weights within 4–6 weeks after surgery**.**

From the researchers point of view, it is useful to encourage the patients gradually to do the exercises by gentle range of motion exercises and increase the rate of movements and more resistive exercises to limit the stiffness of arm ,shoulder or hand and improve shoulder dysfunction after that .

Das et al (2018),reported that to prevent loss of arm function and achieve a rapid return to an active social life after breast cancer surgery, a progressive rehabilitation program are required to maintain the flexibility and elasticity of the muscles surrounding the shoulder joint on the affected side. Progressive upper extremity exercise plays an important role in the rehabilitation of patients after modified radical mastectomy.

In relation to sleep and pain in arm, shoulder or hand the current study explained that, less than half of the studied sample had mild difficulty to sleep because of pain in arm, shoulder and hand, about one third of the studied sample had mild or moderate feeling of less confident or less useful because of arm, shoulder or hand problem post exercises. The current study also showed that, more than half of the studied sample felt no difficulty to using usual technique for work or to spending usual amount of time doing work post exercises but two thirds of them felt moderate difficulty to do work as well as would like post exercises according to disability of shoulder, arm and hand questionnaire(DASH).

Vecchia et al, (2018).. in their study in 60 post mastectomy patients randomized into two groups of thirty patients each found that patients had significant restriction in shoulder ROM of flexion, external rotation and abduction. This restriction decreased in the exercise group and the difference at the end of 6 weeks was significant.

The DASH (disability of shoulder, arm and hand questionnaire) is one of the most commonly used patient reported outcomes

(PRO) measures for upper extremity assessment. It has been validated in the general population and was found to be the most effective instrument for evaluating patients with disorders involving multiple joints of the upper limb. The DASH can detect and differentiate small and large changes in disability over time after surgery in patients with upper extremity musculoskeletal disorders. **Boing,(2020).**Shoulder-arm exercises are one set of exercises recommended for breast surgery patients and can persist for a long time before other exercise recommendations; the timing of rehabilitation exercise to prevent lymphedema after surgery depends on limitations of the shoulder and arm **Eljabu,(2016)**.

Conclusion:

The total score of the study group pre shoulder exercises had a highly statistically significant correlation with the total score of the studied group post and follow up shoulder exercises. Shoulder exercises in post mastectomy patients improves upper extremity range of motion and reduces pain. Shoulder exercises were also found to improve shoulder function and upper extremity activities of daily living (ADL).

Recommendations:

1-Continuous education of patients to do shoulder exercises which can play an important role in improving shoulder dysfunction after mastectomy.

2-Asimple illustrated booklet written in Arabic language and posters of shoulder exercises should be developed for breast cancer patients to prevent shoulder dysfunction after mastectomy.

3-Establish in service training nursing education to update nurses 'knowledge and skills about shoulder exercises.

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