

Effect of Nursing Rehabilitation with /without Mirror Therapy on Upper Limb Selected Outcomes among Women Post Mastectomy

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Abstract: Background: Breast cancer (BC) is considered among the most frequently reported cancer types worldwide. Shoulder dysfunction is one of the most common complications following breast cancer surgery. **Purpose:** To determine the effect of nursing rehabilitation with or without mirror therapy on upper limb selected outcomes among women post Mastectomy. **Setting:** Surgical department and outpatient clinic of Menoufia University Hospital in Shebin El-Kom, Menoufia Governorate, Egypt. **Sampling:** A consecutive sample of 108 women were selected and divided alternatively into three equal groups: 36 women for each group (study1, study2 and control group). **Instruments:** Three instruments were used Knowledge of women structured questionnaire, Disabilities of Arm, Shoulder. The Disabilities of Arm, Shoulder, and Hand Questionnaire (DASH) self-reported questionnaire. **Results:** There was a highly statistical significant improvement of women's knowledge scores in study group1(66.6%) than study group2(63.9%) and control group (13.9%) post nursing rehabilitation than pre-nursing rehabilitation. Mean total disability score were highly significantly decreased in study1 (16.06±6.05) than study2(17.24±5.53) and control group (38.23±5.60) at 4 and 8 weeks post mastectomy. Pain intensity level of the affected were highly significantly increased to 61.1% for study group 1 and 41.7% of study group 2 versus 0% for control group eight weeks post mastectomy and mean total shoulder function score was highly significantly increased in study group1 than study 2 and control group at 4 and 8 weeks post mastectomy. **Conclusions:** Exercise- based mirror therapy was effective in improving shoulder function among women post mastectomy. **Recommendations:** Supervised health education should be carried out for all women post mastectomy about nursing rehabilitation to improve their shoulder function and a colored illustrative booklet about mastectomy, upper limb complications and range of motion exercises should be available to women post mastectomy.

Key words: Mastectomy, mirror therapy, Nursing rehabilitation, Range of motion exercises

Introduction: -

Breast cancer is one of the most frequent and numerous malignant tumors that affect women. It develops as a result of several internal and external factors (Aizaz et al., 2023). Poor lifestyle choices, environmental factors, and social-psychological factors are all linked to its occurrence. In Egypt, breast cancer is the most common malignancy in women, accounting for 38.8% of cancers in population, with the estimated number of breast cancer cases nearly 22,700 in 2022 and forecasted to be approximately 46,000 in 2050 (Elmaadawy et al., 2022). Breast cancer according to National Cancer Institute in Egypt, is the most common cancer detected among women, accounting for approximately one in three cancers, an approximately 30,000 new women with breast cancer estimated annually In Egypt (World Health Organization (WHO), 2024).

Mastectomy may lead to complications such as pain, nipple necrosis, sarcoma, hematoma, infection, implant loss and wound dehiscence nerve, muscular, joint and vascular lesions, axillary web syndrome, intercostal brachial nerve syndrome, winged scapular, phlebitis, thrombophlebitis, lymphangitis, stiffness, loss of strength and transitory edemas (Somashekhar et al., 2023).

Shoulder complications problems are limited range of motion (ROM), stiffness, weakness and pain in shoulder (Thalji et al., 2023). It has been reported that the prevalence of limited ROM in shoulder is 32.9 % at 1 year after axillary lymph node dissection, and the incidence rate of

pain and numbness is 51.1 % in BCS 2 years after breast cancer surgery (Kikuuchi et al., 2021).

Mirror therapy (MT) is a classic rehabilitation therapy based on visual feedback of planar mirror, which helps patients to restore the motor and sensory functions of the limbs (Campo-Prieto & Rodríguez-Fuentes, 2022).

Application of mirror therapy may promote the functional recovery of shoulder joint, reduce the occurrence of upper limb dysfunction and increase the compliance of shoulder exercise, (Zhu et al., 2023).

It has been shown that post mastectomy range of motion exercises allow for the recovery of the previous functional capacities, strength and flexibility, improvement of the pain symptom and asthenia, as well as the reduction of alterations in the hematological picture such as neutropenia, anemia, and thrombocytopenia (Rogers et al., 2023).

Nurses have a major role in managing patients with mastectomy before and after the operation and later on at the follow-up periods. Preoperative nursing care includes providing education and preparation for the patients who are going to perform surgical treatments (Mahmoud et al., 2023).

Significance of the Study

Breast cancer is the most common cancer seen in women, constituting 22% of all cases worldwide. About 6,85,000 people died in 2020 due to breast cancer worldwide, which

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affected 2.3 million women (Estebansari et al., 2023).

Purpose of the Study

To determine the effect of nursing rehabilitation with or without mirror therapy on upper limb selected outcomes among women post Mastectomy

Research Hypotheses:

- Post Mastectomy women who follow nursing rehabilitation with mirror therapy (study group 1) will have fewer upper limb outcome problems than women in the control group.
- Post Mastectomy women who follow nursing rehabilitation without mirror therapy (study group 2) will have fewer upper limb outcomes than women in the control group.
- Post Mastectomy women who follow nursing rehabilitation with mirror therapy (study group 1) will have fewer upper limb outcomes than women who follow nursing rehabilitation without mirror therapy (study group 2).

Definition of variables

- **Nursing rehabilitation:** is operationally defined as gentle range of motion exercise that would be initiated in the first week, resistive exercise that would be done 4-6 weeks following surgery. Active stretching exercise that would be started when the drain is removed, It will also include upper limb free range of motion with mirror for study group 1 and without mirror therapy for study group 2 after Mastectomy.
- **Selected outcomes:** They are impaired limb function, pain,

swelling and stiffness of the affected limb. They were assessed using instruments two and three

Methods

Research design:

A Quasi-experimental research design was utilized in this study (study1, study & control group).

Research Setting:

The study was carried out in at surgical department and outpatient clinic of Menoufia University Hospital in Shebin El-Kom, Menoufia Governorate, Egypt.

Sample:

A consecutive sample of 108 women were selected and divided alternatively into three equal groups: 36woman for each group (study1-study2 and control).

Instruments:

Instrument one: It was developed by the researcher to assess baseline bio-sociodemographic data. It is comprised of two parts as the following:

- **Part one: Sociodemographic data:** It included information about women's age, marital status and having children.
- **Part two: Women' knowledge:** It included questions to assess women's knowledge about breast cancer (definition, risk factors, clinical manifestations, diagnostic studies and treatment), (Types of breast cancer surgeries and complications) as well as post mastectomy rehabilitation post mastectomy exercises).

Scoring system:

The total knowledge score was categorized into three categories

- Poor < 60%.
- Fair 60% to < 75 %.
- Good ≥ 75%.

Instrument two: The Disabilities of Arm, Shoulder, and Hand Questionnaire (DASH):

that was developed by Dixon et al., (2008). It composed of 30-item. It was used by researcher to measure the function and symptoms of the affected upper limb. This questionnaire is rated on a five-point Likert scale, and the higher score indicates heavier problems in arm functioning or symptoms. The questionnaire assesses the problems in daily functioning from the arm, shoulder, or hand troubles (21 items), abnormal symptoms of the arm (5 items) and the effects of arm functional problems on social activities, work, sleep, and psychology (4 items).

Scoring system:

It was calculated by the following formula

$$\text{DASH DISABILITY/SYMPOM Total SCORE} = \frac{(\text{sum of n responses}) - 1}{n} \times 25$$

Instrument three: Constant-Murley Score: -

that was developed by Constant & Murley (1987) and adopted by Constant et al., (2008) and used by the researcher for assessing shoulder function.

Scoring system:

The CMS is a 100-point scoring system that is divided into 4 subscales: pain (15 points), general daily activities (20 points), range of motion (ROM; 40 points), and strength (25 points). Total points were summed to obtain the total score. The higher the score, the higher improving in shoulder function.

Validity:

All instruments were tested for face validity by 5 experts in the field of Medical-Surgical Nursing Department Faculty of Nursing, Menoufia University. Modifications were done to ascertain relevance and completeness.

Reliability of the instruments:

Cronbach's α of women' knowledge is 0.944, Disabilities of Arm, Shoulder, and Hand Questionnaire (DASH) is 0.766, Visual Analogue Pain Scale (VAS) is 0.810 and Constant-Murley Score (CMS) is 0.718. So, it can be concluded that all instruments have adequate level of reliability.

Ethical Consideration:

A written ethical approval was obtained from Ethical and Research Committee of the Faculty of Nursing, Menoufia University, No (920) year 2023. All women were informed about the purpose, procedure, and benefits of the study, and then a written consent was obtained from each woman. All women were informed that participation in the study is voluntary, refusal to participate would not affect their care and they can withdraw from the study at any time without penalty. Confidentiality and anonymity of women were assured through coding all data and put all

papers in a closed cabinet. The nature of study and instruments didn't cause any physical or emotional harm. The control group received the rehabilitation program at the end of the study.

Pilot study: -

A pilot study on 10% of the study sample (eleven patients) was conducted to test the feasibility, clarity and applicability of the instruments, slightly modifications were done and so they were excluded from the actual study.

Procedure:

- A formal letter was submitted from the Dean of the Faculty of Nursing, Menoufia University to the director of Menoufia University Hospital to obtain approval after explaining the purpose and the methods of data collection then a written permission to carry out the study from responsible authorities was obtained.
- Data collection extended over a period of 11 months from March 2023 to January 2024.
- Women who agreed and fulfilled the inclusion criteria were assigned randomly and divided alternatively into three equal groups (study group 1, study group2 and control group).
- Patients who agreed to participate in the study and fulfilled the inclusion criteria were interviewed individually by the researcher at surgical ward
- The study was conducted on four phases: Assessment, planning, implementation, and evaluation phases as a following:

❖ I Assessment phase:

- The baseline assessment completed by the researcher individually two days before surgery at women surgical ward that took about 20-30 minutes for each woman.
- Each woman group was interviewed by the researcher, for assessing sociodemographic, medical data and their knowledge about breast cancer using instrument I.
- Post mastectomy by four weeks, the researcher met all studied women at the surgical outpatient clinic for assessing the following:
 - The function and symptoms of the affected upper limb using Disabilities of Arm, Shoulder, and Hand Questionnaire (DASH) (instrument two)
 - Shoulder function using Constant-Murley Score (CMS) (instrument three).
- All these assessments took about 60 minutes.

II Planning phase

- A colored illustrative booklet with pictures and video were prepared by researcher based on recent literature review (Wikipedia, (2023); American Cancer Society (2023); Yuan et al., 2021) and baseline needs of studied women. The booklet included information about the following:
 - Anatomy and functions of the breast.
 - Breast cancer: Definition, risk factors, clinical manifestations, diagnostic studies, stages, prevention and treatment modalities. Breast cancer surgeries

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- Nursing rehabilitation post mastectomy: Pharmacological and non-pharmacological methods to reduce post mastectomy pain, and post mastectomy range of motion exercises:

III Implementation phase:

- The researcher divided each study group (1,2) in six subgroups. Each subgroup had six women.
- The researcher conducted fifth teaching sessions for each sub group of both study groups two days before surgery. During the first day, the researcher conducted the first session in morning, while the second in the afternoon and the third in the evening.
- During the second day the researcher conducted the fourth session in morning and the fifth session in the afternoon the day before surgery.(The days of mastectomy in Menoufia University Hospital are Sunday, Monday and Wednesday). Each of all these sessions took about 30-45 minutes.
- Each session started with summary review of the previous session and with conclusion of its content.
- During the second and third assessment (within four and eight weeks post third teaching session) the researcher reinforced the participants by phone to assure their performance of post mastectomy exercises rehabilitation, especially upper arm exercises
- The researcher distributed the prepared booklet for every woman of both studied groups at the first session and send a copy of the prepared video.
- **During the first session:** Each subgroup received information about breast anatomy and functions, breast cancer, types of breast cancer surgeries and post-operative complications.
- **During the second session:** instructions were given post-operative about rehabilitation such as method of performing deep breathing exercise.
- Pharmacological and non-pharmacological pain management such as heat and cold application were also explained for both study groups.
- Moreover, during this session each sub group were instructed about importance of doing gentle circular massage around the resected area
- Relaxation technique, imagery and distraction were also illustrated by focusing attention on other things and trying to relax, such as listening to music.
- Moreover, during this session each sub group were instructed about importance of following a well-balanced diet
- Caring for wounds after a mastectomy is also illustrated to ensure proper healing and minimize complications.
- **During third, fourth and fifth sessions:** Demonstration about range of motion exercises with or without mirror therapy were illustrated by the researcher. These exercises started in the morning of the second day of surgery for all studied women.

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- **For Study group (1)** exercises were done with mirror therapy, Standing mirror was placed in front of them, the reflective side faced the unaffected limb, and the affected limb was hidden behind the mirror. Women were asked to concentrate on the reflection in the mirror and to lean forward slightly. While study group (2) were instructed to perform the exercises without mirror therapy.
- During the third session: Each subgroup of group (1) were instructed about ball Squeeze exercise and shoulder taps exercise
- At the beginning of the fourth session: The researcher reviewed the previous learned exercises then women were instructed about Elbow and arm flexion, and extension exercises and shoulder side lifts wall exercise.
- During the fifth session: The researcher asked the women to re-demonstrate the learned exercises, then they were instructed about forward-backward arm swings exercise, firstly they stood with arms placed on either side of the body while non- affected arm in the front of mirror, secondly, they were asked to lift arms forward and backwards to achieve maximum ROM.
- **For the study group 2**
- During the third session: women were instructed about ball Squeeze exercise and shoulder blade squeeze exercise.
- During the fourth session: women were asked about previous learned exercises then they were instructed about side bends exercise and elbow push-back exercise.
- At the beginning of the fifth session: women were asked about previous learned exercises then they were instructed about shoulder side lifts wall exercise. Researcher ask women to turn their sideways with affected side toward the wall, slide or walk fingers up the wall as far as possible, When getting to the point where felling a good stretch (but not pain), take 3 to 5 deep breaths and hold the stretch for 10 seconds, to return to the starting position by walking fingers back down the wall and trying to reach a little higher each time.

IV Evaluation phase

- Evaluation of all studied women of all groups were carried out after four weeks post fifth teaching session using all instruments post mastectomy except part I, II of first instrument.
- Evaluation of all studied women of all groups were carried out two month posts fifth teaching session post mastectomy using all instruments except the first instrument.
- A comparison between all studied groups was carried out to determine the effect of nursing rehabilitation on upper limb selected outcomes post mastectomy.

Statistical

The data collected were tabulated & analyzed by SPSS (statistical package for the social science software) statistical package version 20 on IBM compatible computer.

Two types of statistics were done:

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- **Descriptive statistics:** were expressed as mean and standard deviation (X+SD) for quantitative data or number and percentage (No & %) for qualitative data.
- **Analytic statistics:**
 - 1) Pearson Chi-square test (χ^2) and Fisher Exact test.
 - 2) Student t- test is used for comparison between two independent groups of normally distributed quantitative variables.
 - 3) ANOVA test is a test of significance used for comparison between more than two independent groups of normally distributed quantitative variables.
 - 4) Repeated measures ANOVA: is a test of significance used for comparison between more than two related groups of normally distributed quantitative variables.
 - 5) Spearman correlation: is a test of significance used for quantitative variables that were not normally distributed or when one of the variables is qualitative.
- P-value > 0.05 to be statistically insignificant.
- P-value $\leq$ 0.05 to be statistically significant.
- P-value $\leq$ 0.001 to be highly statistically significant.

Results

Table(1): It is observed that about one third of control, study group1& study group2 (33.3%, 41.7 % &41.7 % respectively) had fifty four to less than fifty five years with a mean age 46.05 ± 10.82 years for control group and 47.75 ± 9.30 years for study group 1 and 45.66 ± 1.89 for study group2.

About one third of control group (30.6%), study group1 (33.3%) and study group 2 (38.9%) had higher level of education. As well as, more than half of them (69.4%, 58.3 % & 55.6%) were housewives.

Figure (1): shows that minority of control group, study group 1 and study group 2 (11.1%, 19.4% & 13.9% respectively had good total knowledge level pre nursing rehabilitation that were highly significantly increased to 66.6% for study group 1 and 63.9% for study group 2 versus 13.9% among control group post nursing rehabilitation.

Table (2): presents that the mean total score of function and symptoms of the affected upper limb for control, study1 and study2 were 68.12 ± 8.07 , 41.40 ± 6.98 and 41.61 ± 6.36 respectively four weeks post mastectomy that were highly significantly decreased among study group1 and study group2 to 16.06 ± 6.05 and 17.24 ± 5.53 respectively versus 38.23 ± 5.60 for control group eight weeks post mastectomy, however the decreasing mean total score of function and symptoms of the affected upper limb was significant among study group1 than study group 2 eight weeks post mastectomy.

Table (3): reveals that 0.0 % of all studied groups did not have pain in 4 weeks post mastectomy that was highly significantly increased to 61.1% for study group 1 and 41.7% of study group 2 versus 0% eight weeks post mastectomy.

Figure (2): shows that mean total shoulder function level for control, study group1 and study group 2 were

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36.6%, 58.44% and 58.38% respectively four weeks post mastectomy that were highly significantly increased to 82.63% and 77% among study group1 and study group 2 respectively versus 64.83% for control group eight weeks post mastectomy. Also, there was highly significant differences between study group 1 and 2 eight weeks post mastectomy.

Figure (2): This figure shows that mean total shoulder function level for control, study group1 and study group 2 were 36.6%, 58.44% and 58.38% respectively four weeks post

mastectomy that were highly significantly increased to 82.63% and 77% among study group1 and study group 2 respectively versus 64.83% for control group eight weeks post mastectomy. Also, there was highly significant differences between study group1 and 2 eight weeks post mastectomy.

Table(4): shows that there were highly significantly improvement of approximately all subtotal shoulder function levels among study group 1 and 2 than control group 4 and 8 weeks post mastectomy.

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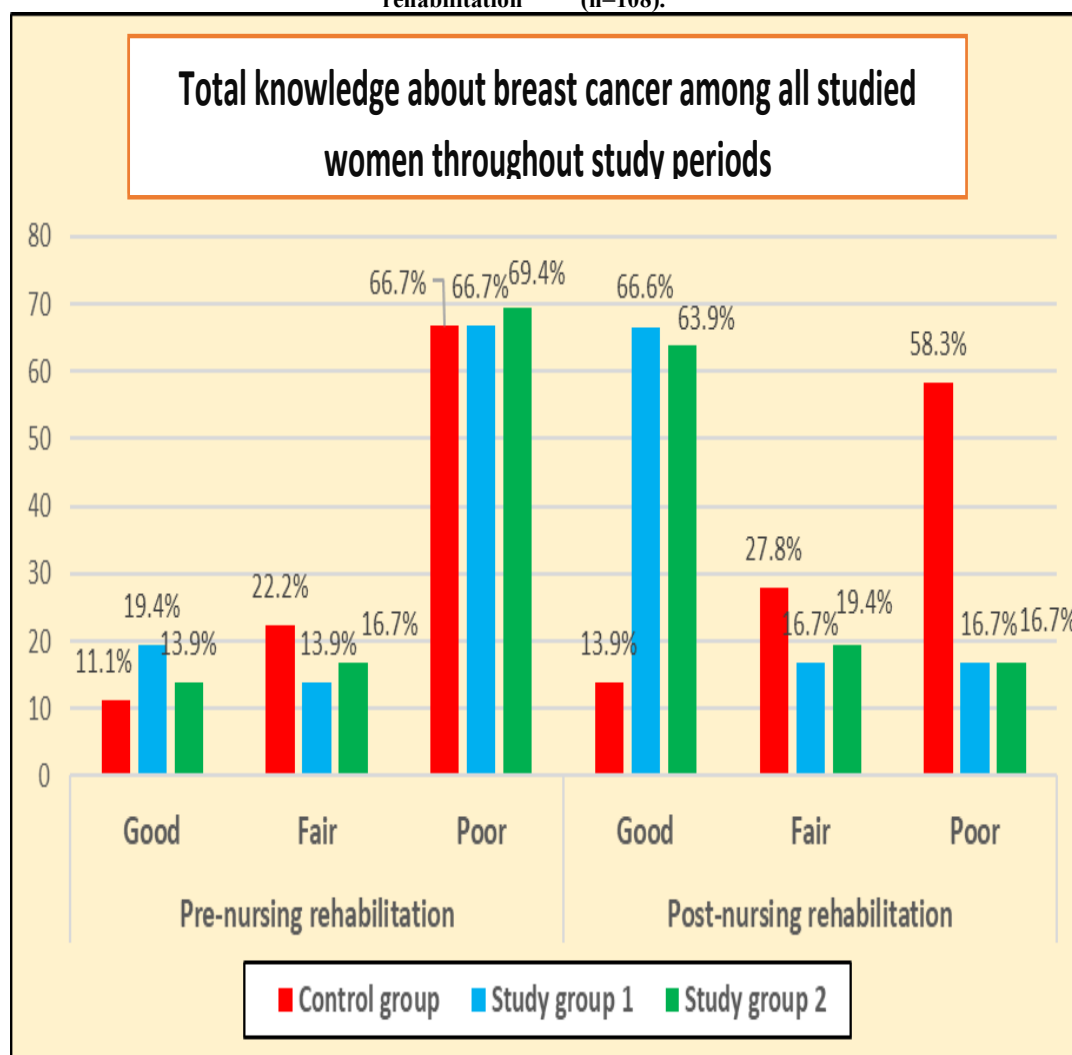
Table (1): Distribution of all studied women according to their socio demographic data (n=108).

Socio demographic data		Control group (n=36)		Study group 1 (n=36)		Study group 2 (n=36)		X ²	P-Value
		No.	%	No.	%	No.	%		
Age (Year)								6.198	0.625
18-<25	3	8.3	0	0.0	4	11.1			
25-<35	2	5.6	3	8.3	3	8.3			
35-<45	9	25.0	7	19.4	8	22.2			
45-<55	12	33.3	15	41.7	15	41.7			
55 – 65	10	27.8	11	30.6	6	16.7			
Mean ± SD	46.05±10.82		47.75±9.30		45.66±1.89		F=0.397	0.673	
Educational level								8.208	0.609
Illiterate	6	16.7	5	13.9	1	2.8			
Read and write	4	11.1	8	22.2	5	13.9			
Primary education	4	11.1	2	5.6	4	11.1			
Secondary education	7	19.4	8	22.2	9	25.0			
Higher education	11	30.6	12	33.3	14	38.9			
Post graduate studies	4	11.1	1	2.8	3	8.3			
Occupation								8.522	0.074
House wife	25	69.4	21	58.3	20	55.6			
Administrative work	9	25.0	10	27.8	16	44.4			
Manual work	2	5.6	5	13.9	0	0.0			
Marital status								4.229	0.646
Single	4	11.1	3	8.3	5	13.9			
Married	21	58.4	21	58.4	20	55.6			
Widowed	8	22.2	12	33.3	9	25.0			
Divorced	3	8.3	0	0.0	2	5.5			
Having children								5.999	0.050
1-3	19	52.8	18	50.0	17	47.2			
4-6	10	27.8	13	36.1	6	16.7			
>6	2	5.5	0	0.0	0	0.0			
No	5	13.9	5	13.9	13	36.1			
Reason for abnormal feeding								5.991	0.050
Nipple inflammation	5	13.9	2	5.6	0	0.0			
Clogged milk ducts	0	0.0	0	0.0	3	8.4			
Breast Engorgement	2	5.5	1	2.8	4	11.1			
Decreased milk amount	4	11.1	6	16.6	7	19.4			
No	5	13.9	7	19.4	5	13.9			
Normal feeding	20	55.6	20	55.6	17	47.2			

X²: Chi Square Test, F= One-way Anova test, SD= Standard deviation.

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Figure (1): Percentage distribution of total knowledge level among all studied women pre and post nursing rehabilitation (n=108).



Test of significant					
(p ₁)	(p ₂)	(p ₃)	(p ₄)	(P ₅)	(P ₆)
X ² =1.510 p=0.470	X ² =0.417 p=0.812	X ² =21.78 p=0.000**	X ² =20.43 p=0.000**	X ² =0.445 p=0.801	X ² =0.098 p=0.952

- P₁: p value for comparing between control group and study group1 4weeks post mastectomy.
- P₂: p value for comparing between control group and study group2 4weeks post mastectomy.
- P₃: p value for comparing between control group and study group1 8weeks post mastectomy.
- P₄: p value for comparing between control group and study group2 8weeks post mastectomy.
- P₅: p value for comparing between control group and study group1 4weeks post mastectomy.
- P₆: p value for comparing between control group and study group2 4weeks post mastectomy.

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Table (2): Mean total score of function and symptoms of the affected upper limb among all studied women four and eight weeks post mastectomy n= (108)

Total score of function and symptoms	Control group		Study group 1				Study group 2		Test of significant			
	4 weeks post mastectomy	8 weeks post mastectomy	4 weeks post mastectomy	8 weeks post mastectomy	4 weeks post mastectomy	8 weeks post mastectomy	4 weeks post mastectomy	8 weeks post mastectomy	(p ₁)	(p ₂)	(p ₃)	(p ₄)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD				
Total disability score	68.12±8.07	38.23±5.60	41.40±6.98	16.06±6.05	41.61±6.36	17.24±5.53			t=15.019 p=0.000**	t=15.469 p=0.000**	t=16.11 p=0.000**	t=15.98 p=0.000**

t: Independent samples t-test.

P= p-value.

**Highly significant at p < 0.01

- P₁: p value for comparing between control group and study group1 4weeks post mastectomy.
- P₂: p value for comparing between control group and study group2 4weeks post mastectomy.
- P₃: p value for comparing between control group and study group1 8weeks post mastectomy.
- P₄: p value for comparing between control group and study group2 8weeks post mastectomy.

Table (3): Distribution of the pain intensity level of the affected shoulder among all studied groups four- and eight-weeks post mastectomy n= (108)

Pain intensity level		Control group (n=36)				Study group 1 (n=36)				Study group 2 (n=36)				Test of significant			
		After 4 weeks		After 8 weeks		After 4 weeks		After 8 weeks		After 4 weeks		After 8 weeks		(p ₁)	(p ₂)	(p ₃)	(p ₄)
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%				
Intensity of the pain	None	0	0.0	0	0.0	0	0.0	22	61.1	0	0.0	15	41.7	X ² =42.00 p=0.000**	X ² =43.03 p=0.000**	X ² =40.50 p=0.000**	X ² =33.23 p=0.000**
	Mild	0	0.0	18	50.0	21	58.3	14	38.9	22	61.1	21	58.3				
	Moderate	15	41.7	18	50.0	15	41.7	0	0.0	14	38.9	0	0.0				
	Severe	21	58.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0				

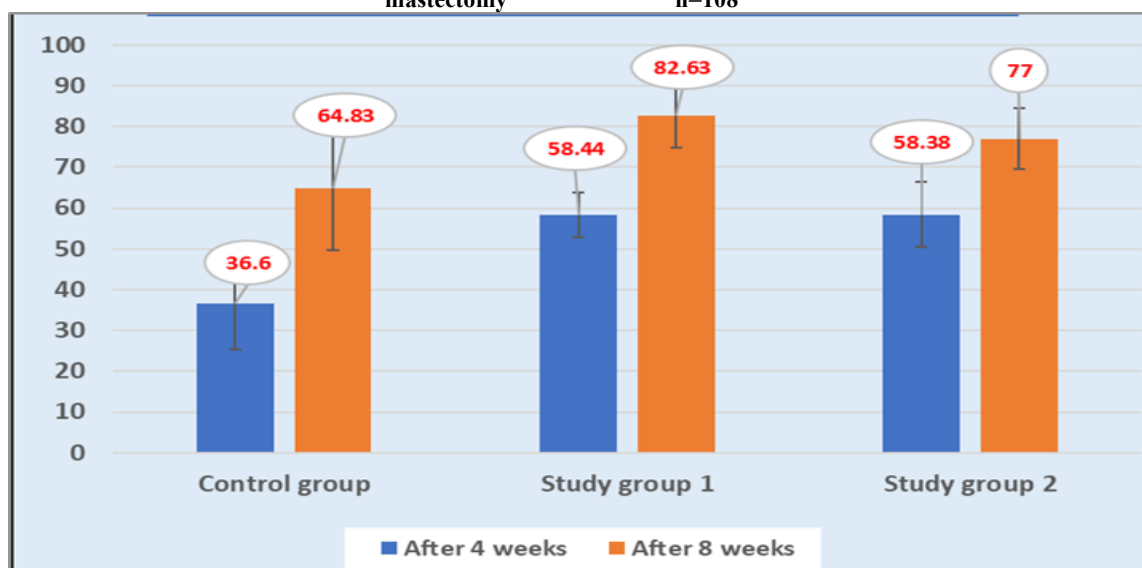
X²: Chi-square test.

**Highly significant at p < 0.01.

- P₁: p value for comparing between control group and study group1 4weeks post mastectomy.
- P₂: p value for comparing between control group and study group2 4weeks post mastectomy.
- P₃: p value for comparing between control group and study group1 8weeks post mastectomy.
- P₄: p value for comparing between control group and study group2 8weeks post mastectomy.

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Figure (2) Mean total shoulder function level among all studied women four and eight weeks post mastectomy n=108



- P₁: p value for comparing between control group and study group1 4weeks post mastectomy.
- P₂: p value for comparing between control group and study group2 4weeks post mastectomy.
- P₃: p value for comparing between control group and study group1 8weeks post mastectomy.
- P₄: p value for comparing between control group and study group2 8weeks post mastectomy.
- P₅: p value for comparing between study group1 and study group2 4weeks post mastectomy.
- P₆: p value for comparing between study group1 and study group2 8weeks post mastectomy

Discussion

Breast cancer is one of the most frequent cancers worldwide. This cancer is more common in women than men. The basic difference between male and female breasts shows this. The cause of this cancer may be unknown. Atypical living cell proliferation is a known breast cancer risk factor (Cuthrell & Tzenios, 2023). Demographic characteristics of the studied groups, the findings of the present study revealed that about one third of all groups had 45-55 years and higher education. However, about half of them were housewives, had one to three children and lived in rural areas. These findings are supported by Yuan et al. (2023) who studied "The effects

of the mirror therapy on shoulder function in patients with breast cancer following surgery in China.

Concerning Women's knowledge, the current study findings revealed that about two thirds of all groups had poor total knowledge level pre nursing rehabilitation that stress the need of these women to knowledge to lessen their stress and manage themselves. These results are in the same line with Ramadan et al. (2023) who studied "Effect of nursing program on patients' knowledge and self-care strategies regarding lymphedema prevention post mastectomy" in Egypt and showed that majority of their participants had poor knowledge about breast cancer before

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application of nursing program. But, post nursing rehabilitation, there were highly significant improvements of all subtotal and total knowledge scores for both study group1 and 2 than pre nursing rehabilitation. These findings agree with Wang et al. (2023), who studied “The Effectiveness of an upper limb rehabilitation program on quality of life in breast cancer patients after mastectomy” in Taiwan and demonstrated that there was clear improvement of knowledge after nursing rehabilitation among study group.

Regarding total disability score, the present study revealed that there were a highly significant decreased in total disability score in both studied groups compared to control group four and weeks post mastectomy. The findings in the same line, Roustae et al. (2022) who reported that disability score was significantly decreased in mirror group rather than control group after 3 weeks of intervention. Also, these finding agreed with Okamura et al. 2024 who studied ‘Effects of a virtual reality-based mirror therapy system on upper extremity rehabilitation after stroke’ and showed that there was a highly significant decrease in disability scores among study group 1 and study group 2 compared to control group eight weeks after mastectomy. Moreover, these finding was in line with Chinnavan et al. (2020) who studied “Effectiveness of mirror therapy on upper limb motor functions among hemiplegic patients” showed that majority of mirror therapy group had significant decreased in disability sore compared to control

group four- and eight-weeks post intervention.

Regarding the intensity of the pain. The present study revealed that there was no one of all studied groups complaining of pain 4 weeks post mastectomy and there were highly significantly increased at 8weeks post mastectomy compared to control group. This study findings are consistent with Campo-Prieto et al. (2022) who studied “Effectiveness of mirror therapy in phantom limb pain” showed that study group (MT group) had lower level of pain 4 and 8 weeks post intervention and MT also reduced medication use.

In relation to total shoulder function, the findings of the current study revealed that there were highly significant increase of mean total shoulder function level among both studied groups 4 and 8 weeks post mastectomy compared to control group, but significantly higher among study group1 than study group 2. On the same trace Yuan et al. (2024) studied “The effects of the mirror therapy on shoulder function in patients with breast cancer” in China and demonstrated a significantly greater therapeutic effect on motor function in the group of mirror therapy. These results support all study hypotheses.

Regarding to strength, the findings of the current study showed that were significant improvement in shoulder muscle strength among both studied groups four weeks post mastectomy compared to control group. These findings are on the same trace with Huo et al. (2024) who showed that were significant improvement in strength 1

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and 3 months post mastectomy. Furthermore, these findings agree with Shao et al. (2021) who studied ‘Effect of different rehabilitation training timelines to prevent shoulder dysfunction among postoperative breast cancer patients’ in China and concluded that there were significant improvement in strength of shoulder 6 and 12 weeks post mastectomy.

Conclusions:

Based on the findings of this study, it can be concluded that:

- There was highly significant improvement of all subtotal knowledge scores in study group1 and study group 2 than control group post nursing rehabilitation than pre-nursing rehabilitation
- Subtotal mean score of all items of function and symptoms of the affected upper limb were highly significant improved among study group 1 than study group 2 and control group 4 and 8 weeks post mastectomy
- Mean total disability score were highly significantly decreased in study1 than study 2 and control group at 4 and 8 weeks post mastectomy.
- Pain intensity level of the affected shoulder was highly significantly decreased in study group1 than study 2 and control group at 4 and 8 weeks post mastectomy.
- Mean total shoulder function score was highly significantly increased in study group1 than study 2 and control group at 4 and 8 weeks post mastectomy

Recommendations:

Based on the findings of the present study, the following recommendations are derived and suggested:

Recommendations for patients:

- Supervised health teaching regarding rehabilitation with mirror therapy should be given for women post mastectomy.

Recommendation for further researches:

- A similar study can be replicated in different setting to strengthen the findings.
- The same study can be replicated on large sample size for generalization of the findings.

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