Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

Effect of Implementing Exercise Program after Modified Radical Mastectomy on Seroma Formation and Functional Ability

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DOI: https://doi.org/10.5281/zenodo.14936269

Published Date: 27-February-2025

Abstract: **Background: Modified radical mastectomy is most common treatment of invasive breast cancer. Perform post mastectomy exercises can reduce seroma formation, stuffiness, pain, fatigue and improve quality of life. Aim: Was to evaluate the effect of implementing exercise program after modified radical mastectomy on seroma formation and functional ability. Design : A quasi-experimental research design was utilized in this study. Setting : Data were collected from surgical oncology department and surgical outpatient clinic at the Oncology Institute in Sohag. Samples: A purposive sample of (80) adult female patients with breast cancer scheduled for modified radical mastectomy. Patients were divided into two equal groups; (40) for each group. Tools: Five tools were utilized for data collection Tool (I) A structured interview questionnaire, (II) Structured Exercise Program Assessment Questionnaire, (III) Seroma Assessment Questionnaire, (IV) Shoulder Functional Ability Assessment Questionnaire and (V) Evaluate Health Problem Regarding Post-Operative Exercise Program Questionnaire . Results: More than half of women in the both groups (70% & 65%) respectively, their ages ranged between (40 – 60) years with mean ages (45.5 ± 11.7) for the study & (44.8 ± 10.8) for the control group, (80%) of women in the study group had no a seroma formation , while (60%) of the women in control group had a seroma formation. There was a highly statistically significant difference between the study and control groups regarding shoulder function, pain intensity and fatigue severity one month and three month after exercises ($p<0.001$). Conclusion: Performing post mastectomy shoulder exercises significantly improved shoulder function, reduced seroma formation, restoring full range of motion of shoulder and arm, reduced pain, fatigue for patients undergoing modified radical mastectomy. Recommandations: The developed educational programme should be implemented on a wider scale and evaluated for further improvement**

Keywords: **Modified radical mastectomy, Seroma formation, Shoulder exercises.**

1. INTRODUCTION

Breast cancer is the most common cause of cancer related morbidity and mortality among female worldwide. Breast cancer usually treated by surgery, which may be followed by chemotherapy or radiation therapy or both. A multidisciplinary approach is preferable. Mastectomy is a surgery to remove one both breasts; there are many types of mastectomy, such as simple mastectomy, subcutaneous mastectomy, radical mastectomy and modified radical mastectomy **(Winer, 2022)**.

Modified radical mastectomy is the most common treatment of invasive breast cancer and it is the removal of all breast tissue from the affected breast with removal of lymph nodes from the armpit in the affected side of the body. This surgery

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

includes the removal of both nipples and areola. Many complications may occur after modified radical mastectomy such as restricted shoulder mobility, shoulder dysfunction, wound infection, stiffness, seroma formation, pain and lymphedema **(Coughlin, 2022)**

Seroma formation is the most common complication following modified radical mastectomy, occurring in 3% to 85% of cases. Seroma can been defined as a collection of serous fluid under the skin flaps or in the axillary dead space following mastectomy and axillary dissection. Although seroma is not life threatening that can be detected by either clinically or sonography , it can lead to significant morbidity such as wound hematoma, delayed wound healing, wound infection, wound dehiscence, prolonged hospitalization, delayed recovery, impaired shoulder function, pain and may delay initiation of adjuvant therapy **(Shigesato & Maskarinec, 2023)**

Seroma formation occurs as a result of lymphatic fluid collection or acute inflammatory exudates in response to surgical trauma and acute phase of wound healing. Seroma can lead to a number of serious complications including wound infection, wound hematoma, delayed wound healing, pain, fatigue, flap necrosis, prolonged hospitalization, as well as delay in initiation of adjuvant therapy **(Coughlin, 2022)**

There are several techniqus in practice that have been reported to prevent or reduce seroma formation such as sclerotherapy, compression dressing, use of drains and shoulder exercises. Treatment options vary from conservative, measure to consccutive evacuating procedures through percutaneous needle aspiration or even re-insertion of a new drainage tube **(Shah & Maydeo 2023)**

Many women will have impairment in shoulder movement that can significantly affect their daily function and quality of life. Restriction of shoulder movement is one of the complications following modified radical mastectomy and axillary lymph node dissection; it may occur as a result of nerve and tissue lesions. To reduce the impairment of strength and mobility of the shoulder, shoulder exercises are commonly prescribed. A women may experience pain around the incision and under the arm after breast surgery because of trauma to the tissue during surgery. Fatigue is the most common side effect of breast cancer treatment **(Singh & kumar Sain, 2023)**.

Early physiotherapy especially shoulder exercise is a common treatment to avoid shoulder dysfunction and restricted shoulder mobility. Physical therapist can suggest and perform post mastectomy exercises that help to regain movement and strength in arm and shoulder, reduce stiffness and improve quality of life. Patient may be able to begin gentile exercise within days after surgery **(Ellis & Mahadevan, 2023)**

Nurses are the largest group of health professionals and closest to the patient, they play an important role in improving shoulder functions, preventing seroma formation and restoring the full range of motion of shoulder and arm after modified radical mastectomy by giving certain directions and instructions regarding postoperative exercises and protective care measures to prevent shoulder dysfunction **(Cutress & Copson, 2022)**

The nursing management of breast cancer patient includes assessing the patient's needs, making appropriate nursing diagnosis and initiate plans for care, helping her to cope with emotions, providing information and psychological support **(Cutress & Copson, 2022)**

Significant of study:

Worldwide, breast cancer is the most common invasive cancer in women it affects about 12% of women around the world **(World Cancer Report, 2022)**. The American Cancer Society's estimates of breast cancer in the United States in 2019 for about 231,840 new cases of invasive breast cancer will be diagnosed in women and about 40,290 women will die from breast cancer (**American Cancer Society, 2021).**

In Egypt, according to official statistics of the Egyptian cancer institute, breast cancer accounts for 35.1% of the total female cancer cases in Egypt and is the most prevalent cancer among Egyptian women **(Faisal, et al., 2022).** According to oncology institute in sohag statistical records in 2020, the commonest sites of cancer in Sohag Governorate were cancer breast (29.9%) and incidence of breast cancer were about 490 patients (483 females and 7 males) **(Statistical Records in Sohage Medical Journal , 2023).**

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

According to the International Cancer Control in Egypt the breast cancer is the most common malignancy in women, according for 38.8% of cancer in this population, with the estimated number of breast cancer cases nearly 22,700 in 2020 & forecasted to be approximately 64.000 in 2050.itis estimated that the breast cancer mortality rate is around 11%being the second cause of cancer related mortality after liver cancer **(Ibrahim, et al ., 2022).**

From researcher observation, observed that there is an increase in the incidence of breast cancer in oncology institute in sohag at, about 490 patients (2020) and modified radical mastectomy is a common surgical procedure in breast cancer. After surgery, the most common postoperative complications are shoulder dysfunction, restricted shoulder mobility, seroma formation, pain and fatigue. To reduce or prevent these complications, shoulder exercises are usually prescribed **(Statistical Records in Sohage Medical Journal , 2023).**

AIM OF STUDY:

The aim of this study is to evaluate the effect of implementing exercise program after modified radical mastectomy on seroma formation and functional ability

Through:

- Assess patient's knowledge and practice regarding post mastectomy exercise
- Design post mastectomy exercise program.
- Implementing of a designed post mastectomy exercise program.
- Evaluate the effect of implementing post mastectomy exercise program on seroma formation and functional ability.

Research question:

What is the effect of implementing exercise program after modified radical mastectomy on seroma formation and functional ability?

Research hypothesis:

At the end of the study the implementing of post mastectomy exercise program has positive effect on prevention of seroma formation and improving functional ability.

2. SUBJECTS AND METHODS

This study was conducted under the following four main designs as the following:

I- Technical Design

II-Operational Design

III-Administrative Design

IV-Statistical Design

I- Technical Design:

Technical Design for this study included a description of the research design, setting, subjects, and tools of data collection.

Research Design:

A quasi-experimental research design was utilized for conducting this study.

Setting:

This study was conducted in the surgical oncology department and surgical outpatient clinic at the Oncology Institute in Sohag. The institute consists of two buildings, a surgical building, and an oncology building.

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

Subject:

Type of sample:

Purposive sample was used in this study.

Sample Size:

The sample size included 80 adult female patients with breast cancer scheduled for modified radical mastectomy within period of nine months from beginning February 2023 to October 2023.

Tools for data collection:

Two tools were used after reviewing the related literature putting into considerations the aim of the study and the data needed to be collected from the studied subject.

Tool (I): A structured interviewing questionnaire:

This tool was designed by the researcher. It was written in asample Arabic language including the following three parts:

Part (I): Socio-demographic data of the studied women:

This part composed of (5 Questions) aimed to collect data related to age, marital status, level of education, occupation and place of residence.

Part (II) Clinical data: This part composed of the following two mean categories aimed to collect data related to ; a) medical history (6 questions) such as diagnosis, date of admission, date of discharge, site of breast cancer, family history and relative relationship . b) Predisposing risk factors of breast cancer (7 questions) such as age of menarche, menopause, age of menopause, age of 1st pregnancy, use the breast feeding, use of pills (oral contraceptive) and number of years for use of pills (oral contraceptive)

Part III: Patient's knowledge assessment:

It was translated into simple Arabic by the researcher it consisted of 13 questions

Tool II: Structured Exercise Program Assessment Questionnaire:

It was developed by the researcher after reviewing the current related lecture from (McRae, 2020) and it is was used to assess patients' upper limb mobility and to evaluate health-related quality of life. Shoulder exercise was written in English language included 14 steps assessed as if full post-operative exercise program

Tool (III): Seroma Assessment Questionnaire:

It was developed from (Shaaban, 2019) and it was used to assess patients' daily wound drainage before and after the drain removal and included:

1-Wound drainage Assessment:

It assessed by emptying the drainage device. It recorded amount and color of wound drainage daily until the drain removal. The drain was removed after permission of the surgeon, usually when the drainage volume was less than 30 ml during the last 24 hrs.

2-Clinical Manifestations of Seroma:

It assessed by researcher in the surgical outpatient clinic when the patient comes for follow up after the drain removal. It recorded clinical manifestation of seroma as bulging of surgical site and fluid movement under site on touch or compression, sloshing of fluid, heavens and tightness, pain and fatigue. In frequency, amount and color of aspirated fluid were recorded. Seroma was specifically looked for and considered clinically significant when a fluid collection of 25 ml or more could be aspirated from beneath the skin flaps after the drain had been removed.

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

Tool (IV) - Shoulder Functional Ability Assessment Questionnaire:

It was developed from American shoulder and elbow surgeons' shoulder evaluation form developed from (McRae, 2020) and it was used to assess functional abilities of the affected shoulder. It was translated into Arabic by the researcher and it includes 13 questions

Tool (V): Evaluate Health Problem Regarding Post-Operative Exercise Program Questionnaire (Appendix IV): It was developed from (McNeely, et al., 2018) and it is used to evaluate health problem related post-operative exercise and was included 2 parts:

Part (I): Pain Numerical Rating Scale: It was used to measure pain intensity after post-operative exercise program. Zero indicates no pain, 1-3 means mild pain, 4-6 means moderate pain and 7-10 means sever pain.

Part (II): Fatigue Severity Scale: It will be used to measure fatigue severity

after post-operative, 0 indicates no fatigue, 1-3 means mild fatigue, 4-6 means moderate fatigue and 7-10 means sever fatigue. It consists of 9 statements.

Validity:

Revision of the tools for clarity, relevance, comprehensiveness, understanding, and applicability was done by panel of five experts in medical and surgical nursing department at Helwan University and to measure the content validity of the tools and the necessary modifications were done accordingly.

Reliability:

This table describes that, there was good internal consistency (reliability) of the tools with Cronbach's alpha coefficients ranging from 0.754, 0.927, 0.805, 0.791, 0.881 to 0.985. It was assessed using Cronbach's alpha reliability coefficient. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (More than 0.7) denote acceptable reliability.

Reliability analysis:

Items	Cronbach's Alpha	P- value
Tool (I): Structured interview	**0.754**	**<0.001**
Tool (II): Exercise program assessment	**0.927**	**<0.001**
Tool (III): Seroma assessment	**0.805**	**<0.001**
Tool (IV): Shoulder functional ability assessment	**0.791**	**<0.001**
Tool (V): Evaluate health problem regarding post-operative exercise program	**0.881**	**<0.001**

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee from faculty of nursing Helwan University. The researcher clarified the aim of the study to the women included in the study to gain their confidence and trust. The researcher obtained written information from women. The researcher assured maintaining anonymity and confidentiality of subject's data. The women were informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time.

II- Operational design:

Preparatory phase:

Included reviewing of past, current, national, and international related literature, and theoretical knowledge of various aspect of the study using books, articles, internet, and magazines to develop tools for data collection. The researcher constructed and prepared the different data collection tools.

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

Pilot study:

The pilot study was carried on 10% (10) of women under study based on sample criteria, it has been conducted to test the applicability, clarity of questions and understand ability of the tool. Then the tool was modified according to the result of the pilot study, so all of subjects who were shared on the pilot study were excluded from the studied sample.

Fieldwork:

- The researcher interviewed the patients with breast cancer who were scheduled for modified radical mastectomy preoperatively at the surgical oncology department to explain purpose and nature of the study and get their oral consent to participate in the study.
- The researcher visited the study setting three days per week (Saturday, Monday and Wednesday) in the morning and afternoon shifts.
- The researcher interviewed with 2 patient from each groups (study and control) for each visit. The researcher met 80 patients, who agreed to be involved in the study sample. Data collection lasted for nine months, from 1st of February 2023 to 30th of October 2023.
- Categorization of the patients into two groups (study and control) (40 patients for each) was done.
- First, the researcher assessed patient's knowledge regarding seroma formation post mastectomy at Oncology Institute in Sohag by collected the knowledge from both groups (study and control) using tool I part III and it took about 30 : 45 minutes to be filled for the both groups (study and control).
- The researcher collected baseline data from both groups (study and control) using tool (II) measure exercise program
- In addition, functional abilities of the affected shoulder were measured by asking the patients to perform specific activities using tool (IV) for both groups. Pain and fatigue were measured using tool (V) part (I and II) for both groups.

III-Administrative design:

An official letter from the Dean of the Faculty of Nursing, Helwan University was directed to the administrators of Sohag oncology institute to obtain an official approval to carry out the study after explanation of the aim of the study. This permission was obtained before the initiation of the data collection.

IV-Statistical design:

Numerical data were presented as mean and standard deviation (SD) values. Qualitative data were presented as frequencies (n) and percentages (%). Reliability of the questionnaire was assessed using Cronbach's alpha reliability coefficient. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (More than 0.7) denote acceptable reliability. Chisqure was used to compare between studied variables. Spearman's correlation coefficient was used to determine correlations between different variables. The significance level was set at $P \leq 0.05$. Statistical analysis was performed with IBMSPSS Statistics Version 26 for

3. RESULTS

Table (1): Number and percentage distributions of socio-demographic characteristics for both groups (n=80).

Socio-demographic characteristics	Study group (n=40).		Control group (n=40).		P- value
	N.	%	N.	%	
Age:					
• 18 < 30 year	0	0	0	0	0.633*
• 30 < 40 year	12	30	14	35	
• 40 ≤ 60 year	28	70	26	65	
Mean ± S.D	**45.5 ± 11.7**		**44.8 ± 10.8**		**0.782***

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

Marital status:					
• Single	0	0	0	0	0.837*
• Married	28	70	30	75	
• Divorced	4	10	4	10	
• Widow	8	20	6	15	
Level of education					
• Illiterate	22	55	20	50	0.788*
• Read and write	6	15	6	15	
• Primary education	8	20	6	15	
• Secondary education	2	5	4	10	
• University education	2	5	4	10	
Occupation					
• House wife	34	85	32	80	0.556*
• Employee	6	15	8	20	
Residence					
• Rural	30	75	26	65	0.329*
• Urban	10	25	14	35	

Table (1) indicates that, , (70 % and 65%) respectively among study and control group, their ages ranged between (40 – 60) years with mean ages (45.5 ± 11.7) for the study & (44.8 ± 10.8) for the control group. (70%, 75% and 55%, 50%) of the women in the study and control groups respectively were married and illiterate respectively. Regarding occupation, were housewives respectively (85% and 80%). When housewives in both group respectively (75% and 65%) of study and control group were living in rural areas. Finally, the table showed that there was no statistical difference between the study and control groups regarding socio-demographic characteristics (P > 0.05).

Table (2): Frequency and percentage distribution of the total level of patient's knowledge for both study and control groups before educational exercise program (pre-operative) , before discharge and 3 months post- exercise program (post-operative) regarding seroma formation (n=80).

Knowledge Levels	Before exercise program (pre-operative)				P. Value	Before discharge				P. value	3 months Post-exercise program (post-operative)				P. value
	Study group (n = 40)		Control group (n = 40)			Study group (n = 40)		Control group (n = 40)			Study group (n = 30)		Control group (n = 30)		
	N	%	N	%	0.739 ns	N	%	N	%	0.001**	N	%	N	%	0.001**
Satisfactory	5	12.5	6	15		37	92.5	7	17.5		36	90	6	15	
Unsatisfactory	35	87.5	34	85		3	7.5	33	82.5		4	10	34	85	

^{ns}= Non significant difference (p > 0.05) * Statistically significant difference (p<0.05) **Highly statistically significant difference (p≤ 0.001)

Table (2) shows that, before the application of the educational exercise program (pre-operative), the highest percentage of patients in the study and control group had an unsatisfactory level of knowledge (87.5% and 85% respectively). Also, after application of the educational exercise program (before discharge as well as 3 months post- exercise program) (post-

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

operative) the highest percentage of patients in the study had an satisfactory level of knowledge (92.5% and 90% respectively) and A statistically significant difference was found between the study and control groups after application of the educational exercise program (before discharge as well as 3 months post- exercise program) (post-operative) with p. value =0.001**.

Figure 1: Frequency and percentage distribution of the total level of patients' of knowledge regarding seroma formation post mastectomy for both groups.

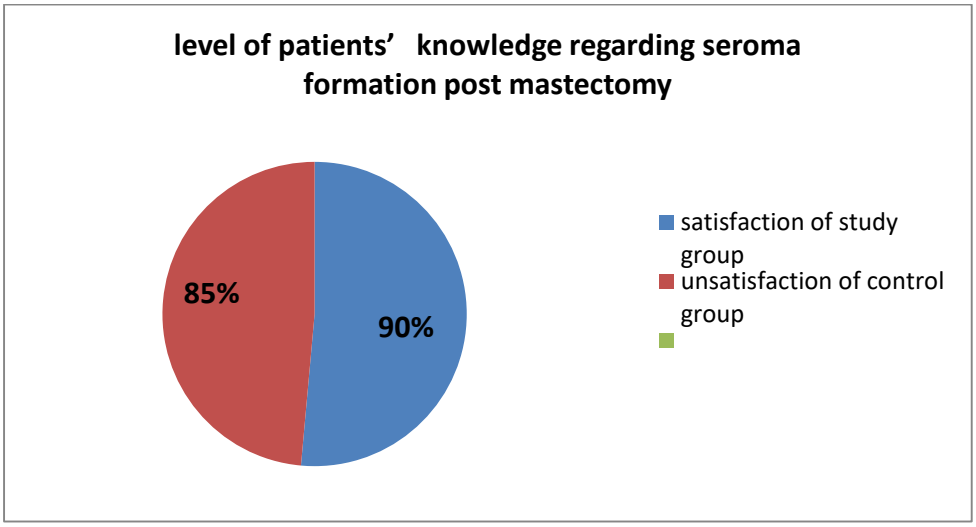

Figure (1): reveals that, (90%) in the study group had satisfactory level of knowledge regarding seroma formation post mastectomy, while (85%) in the control group had unsatisfactory level of knowledge regarding seroma formation post mastectomy.

Table (3): Frequency and percentage distribution of the total level of patient's practice for both study and control groups before educational exercise program (pre-operative) , before discharge and 3 months post- exercise program (post-operative) regarding seroma formation (n=80).

Practice Levels	Before exercise program (pre-operative)				P. value	Before discharge				P. value	3 months post-exercise program (post-operative)				P. value
	Study group (n = 30)		Control group (n = 30)			Study group (n = 30)		Control group (n = 30)			Study group (n = 30)		Control group (n = 30)		
	N	%	N	%	0.119 ns	N	%	N	%	0.001**	N	%	N	%	0.001**
Adequate	0	0.0	3	7.5		32	80	3	7.5		38	95	6	15	
Inadequate	40	100	37	92.5		8	20	37	92.5		2	5	34	85	

*ns= Non significant difference (p > 0.05) * Statistically significant difference (p<0.05) **Highly statistically significant difference (p≤ 0.001)*

Table (3) shows that, all patients in the study group and most of the patients in the control group (100% and 92.5 % respectively) had an inadequate level of practice before application of the educational exercise program. While before discharge and 3 months post- educational exercise program (post-operative) ; the control group still had an inadequate level of practice (92.5% and 85 % respectively) and about (80% and 95 % respectively) of the study group became having adequate practice level before discharge and 3 months post- exercise program (post-operative) with statistically significant difference (P=0.001**) before discharge and after application of the exercise program (post-operative).

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

Table (4): Comparison between the study and control groups as regarding clinical manifestations of seroma formation after drain removal (n=80).

Clinical manifestations of seroma formation	Study (n=40)		Control (n=40)		P- value
	N	%	N	%	
Bulging of surgical site					
• Present	8	20	24	60	< 0.001**
• Absent	32	80	16	40	
Fluid movement under site on touch or compression.					
• Present	8	20	24	60	< 0.001**
• Absent	32	80	16	40	
Sloshing of fluid					
• Present	8	20	24	60	< 0.001**
• Absent	32	80	16	40	
Heaviness and tightness					
• Present	8	20	24	60	< 0.001**
• Absent	32	80	16	40	
Discomfort and pain					
• Present	8	20	24	60	< 0.001**
• Absent	32	80	16	40	
Fatigue					
• Present	8	20	24	60	< 0.001**
• Absent	32	80	16	40	
Aspirated fluid from seroma (if seroma present)					
1- Frequency					
• One time	8	20	24	60	
• Two time	0	0	0	0	
• Three time	0	0	0	0	
2- Amount					
• < 20 ml	0	0	0	0	
• > 20 ml	8	20	24	60	
Mean ± S.D	**115 ± 11.9**		**119.7 ± 92**		**0.258***
3- Color					
• Bloody	0	0	0		
• Serosanguinous	0	0	0		
• Serous	8	20	24		

P > 0.05 no significant difference P *≤ 0.05 statistically significant difference P **≤ 0.001 highly statistically significant difference.

Table (4) demonstrates that, (80%) of study group had no seroma formation while (60%) of the control group had seroma formation. In addition, the table revealed that there was a highly statistical significant difference between the study and control groups regarding seroma formation after drain removal (p < 0.01)

Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
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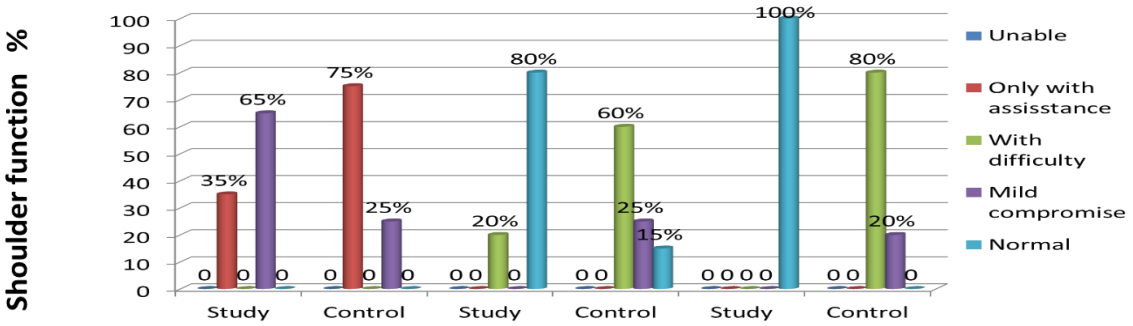
Table (5): Comparison between the study and control groups regarding mean average score of shoulder functional ability before educational nursing exercise program, before discharge and 3 months post-exercise program (n=80):

Times of evaluation	Mean score of general self-efficacy scale		P. value
	Study group (n=40)	Control group (n=40)	
Mean±SD	**Mean±SD**	**Mean±SD**	
Before program	12.37±2.98	13.47±3.08	0.165 ns
Before discharge	35.13±2.32	22.03±4.24	<0.001**
Three month post-program	37.27±3.23	21.23±8.54	<0.001**

ns= Non significant difference (p > 0.05) * Statistically significant difference (p<0.05) **Highly statistically significant difference (p ≤ 0.001)

Table (5) reveals that, was no statistically significant difference between the study and control groups before the application of the nursing exercise program with P. value = 0.165. While a highly statistically significant difference was found between both groups before discharge as well as 3 months post- exercise program. So , that there was a highly significant improvement in the study group compared to the control group regarding shoulder functional ability at before discharge and three-month post-program after performing exercises postoperatively (p<0.01)

Figure (2): Frequency and percentage distribution of the level of shoulder functional ability for both groups



Before exercise program **before discharge** **hree month after exercises**

Figure (2) : reveal that, (65 %) had mild compromised shoulder function of the study groub, while (75 %) of women in control group need assisstance in performing the shoulder function at Before starting exercise program (pre-operative) . (80 %) of the study group had normal shoulder function, while (60%) of control group had difficulty in performing the shoulder function at before discharge postoperatively. Although, all women in the study group had normal shoulder function while the women in the control groups had difficulty in performing the shoulder function at three month after exercises (post-operative).

Table (6): 4-Correlation Co- efficient between Southampton wound assessment scale and exercise rating scale and pain intensity scale (n=80 study and control)

Correlations	Southampton wound assessment scale		
	All(n=80)	Study(n=40)	Control(n=40)
Exercises adherent rating Scale	-.829-**	-.506-**	-.782-**
Pain intensity scale: **- Pain severity**	.741**	.937**	.607**
- Interference Score	.773**	.844**	.632**

P > 0.05 no significant difference P *≤ 0.05 statistically significant difference P **≤ 0.001 highly statistically significant difference

Table (6): The study demonstrates the exercise adherence rating scale, the pain intensity scale (pain severity, pain interference with daily activities), and the Southampton wound evaluation scale had a very statistically significant correlation.

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

4. DISCUSSION

Breast cancer is the most common malignancy in women. Modified radical mastectomy is a frequent surgery employed as therapeutic procedure in patients with breast carcinoma with involvement of axillary lymph nodes. After surgery, the most common postoperative complications are reduced range of motion in the shoulder, seroma formation, muscles weakness, shoulder dysfunction, pain and fatigue. To reduces thesis complications, shoulder exercises are usually prescribed **(Potter, 2021)**

Part I: Demographic characteristics of the studied breast cancer women's.

Regarding marital status, most of the women of the study and the control groups were married. This result was in agreement with **Girmenia (2022),** in a study entitled "A review on breast cancer and its management"**,** who mentioned that the majority of the women in studied groups were married.

In relation to the educational level, most of the women in both groups were illiterate and more than half of the women in both groups were living in rural areas. This is due to the fact that illiteracy rate is higher among women in Egypt accounting (69%) of the total number of illiterate people in Egypt. This result was in accordance with **Tiwari (2021),** in istudy entitled "Effect of educational program regarding therapeutic exercises on women's pain, fatigue and shoulder function undergoing mastectomy", who reported that more than one third of the study group and one-half of the control group were illiterate. This finding contradicted with **Rizk (2022),** in a study entitled "The efficacy of protocol of care on post mastectomies women outcomes"., who revealed that women with the highest educational level had increased incidence of breast cancer when compared to the women with lower education.

Current study found that the occupation, the majority of the women in both groups were housewives. It could be due to high rate of illiteracy among Egyptian women. This result was in agreement with **Bastiaannet & Liefers (2020),** in a study entitled "Breast cancer incidence and case fatality among women in relation to social and ethnic background", who reported that most of both groups were housewives. In addition, this study finding was in accordance with **Azmi (2023), i**in ia istudy entitled "Effectiveness of exercise programmers on shoulder mobility and lymphedema after axillary lymph node dissection for breast cancer", who presented that the majority of the studied women were housewives.

Finding of the study the residence area, more than half of the women of the study and the control groups were living in rural areas. This finding was in agreement with **Turner (2020),** in a study entitled "Systematic review of exercise effects on health outcomes in women with breast cancer", who reported that about half of the study group and more than half of the control group were residence in rural areas.

Part II: Breast cancer women' reported knowledge about shoulder exercise after modified radical mastectomy:

Concerning patients' total level of knowledge, the present study revealed that, the majority of patients in the study and control groups had an unsatisfactory level of knowledge before the application of the nursing exercise educational program. According to the opinion of the researcher, the level of knowledge was insufficient due to in availability of training programs, lacking continuous educations and most health care providers did not routinely counsel women or providing them with written information about mastectomy and self-care practice.

However, after implementing the educational nursing program, the study group patients had a highly significant improvement than those of control with all items of knowledge. This might be due to health instructions given to study patients using different teaching strategies as lectures, discussion, and colored booklet. Also, the researcher emphasized the importance of the patient's knowledge. This study result was in agreement with **Sechopoulos (2022)** who showed that there was a statistically significant difference regarding the mean knowledge score at three different intervals pre, post and follow up intervention regarding breast cancer as a disease as well as post-mastectomy exercises

Part III: Breast cancer women' reported practice about shoulder exercise after modified radical mastectomy:

This finding was in the same line with **Sharma (2020),** who reported that therapeutic exercise has many benefits for all the patients after operation. Exercises are important to prevent contracture of the joints, shortening of the muscles and to improve lymph and blood circulation after mastectomy. Moreover, self-care activities, such as combing the hair, washing the face and brushing the teeth are physically and emotionally therapeutic because they aid in returning and restoring the shoulder function and the sense of normalcy for the patients after mastectomy **Turner (2020)**

International Journal of Novel Research in Healthcare and Nursing
Vol. 12, Issue 1, pp: (83-95), Month: January - April 2025, Available at: www.noveltyjournals.com

This finding was in the shoulder exercises reduced the incidence of seroma with added benefit of improved wound healing and improved shoulder function for study group. This finding disagrees with **Girmenia (2022),** in a study entitled "Lymph drainage of the upper limb and mammary region to the axilla", who found that shoulder immobilization has been favored by some surgeons as a mean for reducing the incidence of seroma.

Part V: correlation between level of knowledge and their level of practice:

Concerning correlation between the postoperative exercise program with seroma formation assessment, outcome of shoulder function ability and fatigue severity after post-operative exercise program of the study group group, there is strongly positive correlation between the postoperative exercise program assessment with seroma formation assessment, outcome of shoulder function ability and fatigue severity after post-operative exercise program of the study group for the study group rather than the control group. This may be due to that the level of attitude is related to age because it is a behavior grow with the person and might change with age this finding was inconsistent with **Potter (2021),** who indicated that In older people, the fear of recurrence and concerns arising from cancer reduce self-efficacy in women with breast cancer.

5. CONCLUSION

In light of the present study, it can be concluded that the research investigated the relationship between various reproductive factors and the risk of premenopausal breast cancer, while considering the participants' ages. The results demonstrated specific associations with factors such as age, marital status, gravidity, abortion, age of menarche, age of first pregnancy, age at first birth, mode of breastfeeding, body weight, menopausal status, and history of diabetes mellitus. In essence, the study successfully addressed the research question concerning the relationships between reproductive factors and the risk of breast cancer among premenopausal women.

6. RECOMMENDATION

Based on the findings of the study results, the following recommendations were advocated:

1. Implementing education programs to enhance awareness of premenopausal women regarding reproductive risk factors associated with breast cancer.
2. Since there are varieties of culture, food choice, feeding habit, physical activities, and other risk factors,
3. it is important to conduct future studies with a larger sample size including different regions or diverse population in order to produce more representative evidence.

Further studies:

Conducting research on a larger scale and across multiple centers can provide more robust and reliable conclusions by capturing a diverse range of demographic, geographic, and healthcare contexts.

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