

Effect of Pre-discharge educational Interventions on Womens' Knowledge and Self-Care Practices Related to Arm Lymphedema Prevention Post mastectomy

Heba Mohamed Gamee ¹, Amal Eid Abdelmoniem Shaaban ²,
Wafaa Gameel Mohammed Ali ²

¹ Clinical Instructor – Mansoura Chest Hospital - Egypt

² Medical-Surgical Nursing Department, Faculty of Nursing, Mansoura University, Egypt

* E-mail of the corresponding author: hebasameh_85@yahoo.com/

hebasameh @ student.mans.edu.eg

Abstract: Lymphedema is a serious complication post-mastectomy and remains to be a great source of morbidity for breast cancer survivors with axillary lymph node dissection. Prevention of lymphedema after mastectomy is important for long-term survival and improvement the QOL. Aim of the study: The study aimed to evaluate the effect of pre-discharge educational interventions on womens' knowledge and self-care practices related to prevention of arm lymphedema after mastectomy. Subjects: The sample consisted of 80 females undergoing mastectomy along the period of 6 months. Tool: six main tools were used for data collection, Tool I: Interview questionnaire sheet, Tool II: Performance observational checklist of exercises, Tool III: Self-reported instructions for arm lymphedema prevention, Tool IV: Arm measuring tool, Tool V: Upper Extremity Functional Index and Tool VI: lymphedema tracking tool. Results: All of study sample was females; nearly half of them were in age group (40- <50), most of patients in both groups had poor knowledge related to lymphedema prevention pre intervention and most of study group had good knowledge post intervention while most of control group had poor knowledge pre and still poor after surgery. Most of control group had lymphedema post-surgery. Conclusions: It was concluded that, pre-discharge educational interventions improved knowledge and self-care practices regarding arm lymphedema prevention post mastectomy and minimizing arm morbidity during the follow up period for women of the study group. Recommendation: It is recommended that, conducting a comprehensive health education program for women following breast cancer surgery to ensure adherence to self-care & prevention of lymphedema and availability of instructional guides for all mastectomy patients.

Keywords: breast cancer, mastectomy, lymphedema prevention, self-care, pre discharge educational interventions.

I. INTRODUCTION

Breast cancer is a serious general health problem worldwide. It is a common form of cancer among women and represents 16% of all female cancers. It is considered the second leading cause of death after lung cancer among women in the United States, and it represents 18.2% of all cancer deaths [1]. Modified radical mastectomy (MRM) remains a common surgical procedure used for the treatment of breast cancer, especially in developing countries. It involves resection of the entire breast, including nipple, areola, skin and fatty tissue under the skin and axillary lymph nodes [2].

Lymphedema is one of the main and most feared complications of breast cancer and its therapies and has long-term physical and psychosocial consequences for patients. It is characterized by an abnormal and regional accumulation of

protein-rich fluid in the interstitial space that can cause edema and chronic inflammation [3]. It is clinically characterized by chronic swelling, localized pain, atrophic skin changes and secondary infections. [3]. Lymphedema remains a major source of morbidity for breast cancer survivors with axillary lymph node dissection. The progressive nature and lack of effective therapies continue to challenge health workers [2]. Lymphedema associated with breast cancer is a life-long concern once it develops. There is no cure for lymphedema, the goals of treatment are to alleviate the irritating symptoms and prevent the worsening of inflammation. Treatment of post-mastectomy lymphedema includes various modalities such as complete decongestant therapy (CDT), arm exercise, manual lymphatic drainage (MLD), skin and nail care, self-massage, compression bandage and the sleeve of the hand [5].

Nurses play an essential role in the prevention of lymphedema after mastectomy through patient education about symptoms and early diagnosis. All patients with breast cancer should be regularly evaluated and questioned about the swelling, altered range of movement of the limbs, the stiffness of the shoulder joint and other symptoms of lymphedema [3]. Arm exercises play a fundamental role in the rehabilitation of patients after mastectomy and improve muscle strength and upper limb function, reduce pain and discomfort and improve quality of life and confidence [2]. The common precautionary behaviors supported by the National Lymphedema Network (NLN) include avoid aggressive skin care to avoid trauma or injury (avoid needle sticks, withdrawals of blood from the affected arm or intravenous sticks), avoid constriction of the limbs (cuff inflation for blood pressure, tight clothing), prevention of extreme temperatures and frequent use of compression garments especially for air travel [6].

Significance of the study

Many studies showed that about 50 -60% of women who treated the breast cancer by surgery develop lymphedema. Breast cancer associated lymphedema is a lifelong concern once it develops, there is no cure for lymphedema, so patients require health education related to knowledge and self-care practices related to lymphedema prevention before discharge. prevention of lymphedema is much more effective than treating the problem after it occurs [5].

Aim of the study:

The study aimed to evaluate the effect of pre-discharge educational interventions on women's knowledge and self-care practices related to the prevention of arm lymphedema after mastectomy.

Research hypotheses:

- 1- After implementation of pre-discharge educational interventions , the knowledge score would be improved among study group more than control group
- 2- After implementation of pre-discharge educational interventions , the self- care practices would be improved among study group more than control group.

II. SUBJECTS AND METHOD

Research design:

Quasi-experimental research design has been used to carry out this study.

Setting:-

This study was conducted at Oncology Center - Mansoura University in the females surgical wards and then, followed in outpatient clinics.

Subjects:-

A purposive sample of (80) females undergoing mastectomy from the previously mentioned setting along six months were included in this study. The total study sample was assigned randomly to two equal groups, each group was 40 females, a study group who received the routine hospital care and the designed pre – discharge educational interventions and a control group who received the routine hospital care only.

Tools of the Study:-

The data of this study were collected using the following tools:

Tool I: Interview questionnaire sheet : was designed by the researcher after reviewing the relevant literature, this tool consisted of two parts:-

Part I: Socio demographic and medical data sheet which consisted of (13) questions such as patient's age, education, marital status, residence, history of surgery, chronic disease and others treatment modalities after surgery.

Part II: Patients' knowledge questionnaire sheet which consisted of six sections; (60) questions ;General knowledge related to breast cancer , knowledge related to arm lymphedema , knowledge related to self -care after surgery , knowledge related to suitable clothes and wound care , knowledge related to good balanced diet, and knowledge related to exercises needed after operation to prevent lymphedema [28].

Tool II: Performance observational checklist of exercises : was utilized to assess women performance level . It included (18) arm and shoulder exercises. Steps of the observational checklist were done by the women three times; the first immediately after the interventions to assess their performance, the second through two weeks after surgery and the third was at three months post mastectomy[4].

Tool III: Self-reported instructions for arm lymphedema prevention: It composed of (16) instructions as measuring blood pressure from the un affected side, avoid exposure to extreme cold and hot and avoid drawing blood sample from the affected side [4].

Scoring system

Each correct answer took 1 score , and if there was no answer or incorrect , zero score was given . The total score for all questions related to knowledge was calculated according to the number of correct answers and categorized into three levels as followings:

- ❖ Poor = Score < 50%
- ❖ Fair = Score 50% - 75%
- ❖ Good = Score > 75%

Tool IV: Arm measuring tool : Used to measure arm circumference in different points at wrist, forearm, upper arm and armpit to detect any changes before, after and at follow up after surgery [25,26].

Tool V: The Upper Extremity Functional Index (UEFI) : This index was utilized to assess the upper limb overall functioning which consisted of 20 items as pushing, lifting, driving, dressing .It was developed by Stratford, 2001 .The index from (0 - 4), the score 0 for extreme difficulty or unable to perform activity, score 1 for quite a bit of difficulty, score 2 for moderate difficulty, score 3 for a little bit of difficulty and score 4 for no difficulty[27].

Tool VI: lymphedema tracking tool : It was used to assess signs of infection, any signs and symptoms of lymphedema and stages of lymphedema . It composed of (12) items . It was developed by Ancukiewicz, et al., 2012 . It used to determine the effect of pre discharge educational intervention on lymphedema occurrence[26].

Validity

All tools of data collection were developed by the researcher except Tool IV (Arm measuring tool) and Tool V (The Upper Extremity Functional Index), and it was examined for content validity by a panel of 7 experts from nursing and medical staff members - Mansoura University, who reviewed the tools for clarity, relevance, understanding and applicability for implementation. All comments and suggestions were considered and rewording, and revising the tools were carried out and necessary modifications were done accordingly.

Reliability

Reliability was measured to evaluate whether all items on the study tools measure the same variable, and how well the used items fit together conceptually. The reliability of the study tools was tested by Cranach's Coefficient Alpha to measure the internal consistency of tool I (r = 0.950), tool II (r = 0.901) and tool III(r == 0.861) and tool VI (r = 0.952).

Administrative phase:

An official permit was obtained by submitting an official letter issued by the director of the nursing faculty of the University of Mansoura to the director of the Oncology Center, director of the department of surgery and outpatient clinics to perform the study.

Pilot study:

The pilot study was conducted in 10% (8) of women undergoing mastectomy at Oncology Center - Mansoura University to assess the applicability, objectivity and relevance of the study tools and the clarity of the designed questionnaires and to estimate the time needed to respond, so the necessary changes have been made. These women were excluded from the study sample and were randomly selected from the surgical departments of the Oncology Center - Mansoura University.

Planning phase:

In this phase, the researcher determine the pre discharge educational interventions strategies (time of sessions, teaching methods, media used and evaluation methods) , determine the teaching place and the intervention finances.

Preparatory phase

Extensive review of the current national and international literatures related to the research title was done using textbooks, articles, and magazines. Implementing this study required the development of six tools for evaluating the effect of pre discharge interventions on lymphedema prevention for women undergoing mastectomy. All tools of data collection were developed by the researcher except Tool IV (Arm measuring tool) and Tool V (The Upper Extremity Functional Index). The pre- discharge educational interventions developed in the form of booklet after reviewing related literatures. It consisted of 5 parts; overview of breast cancer, mastectomy types, lymphedema, exercises and instructions related to lymphedema prevention and lymphedema management.

Implementation phase:

The pre discharge educational interventions applied for women in study group . After a woman was admitted, the researcher visited her preoperatively in the surgical ward, introduced herself, explained the aim of the study, and the agreement of patient's participation in the study was obtained, then the researcher started to ask questions for assessing her knowledge about her diagnosis and treatment, the researcher began the first session of the educational intervention for women in the intervention group, provided information that was needed. Demonstration and redemonstration many times until doing without error.

During two weeks after surgery, the researcher met each woman from the intervention group and control group individually and collecting data related to research tools. Women in the intervention group were encouraged to follow the instructions related to lymphedema prevention and continue to perform arm and shoulder exercises that help in improvement of the upper extremity function and decreased complications. After three months post mastectomy, women came to the outpatient clinics for follow up, the researcher recollected data related to research tools. The interventions of this study was implemented in form of sessions. Each session was started by a summary of the previous session, and the objectives of the new session. At the end of each session, a brief summary was given by the researcher. Using a very simple language that suits the educational level of patients without ignoring motivation and reinforcement techniques. The researcher stressed on the importance of follow up and active participation. Each woman was allowed to ask any question. The educational intervention was conducted through 4 session; (1 theoretical & 3practical sessions), each one took about 30 to 40 minutes. In the theoretical session, women were provided with theoretical knowledge related to breast cancer, mastectomy and its complications, instructions related self-care after mastectomy and instruction related lymphedema prevention. The practical part include arm and shoulder exercises related to lymphedema prevention.

Evaluative phase:

Womens' knowledge, performance, presence of lymphedema and function of the upper limbs were evaluated before and after the implementation of the intervention to identify differences and improvement for each group. The results of both groups were compared to evaluate the effect of the educational intervention on the prevention of lymphedema.

Ethical consideration:

At the time of data collection, an oral agreement was taken from each participant after a clear and adequate explanation of the purpose of the study and its importance to them. All relevant ethical aspects were considered to ensure the privacy and confidentiality of the data collected during the study. Patients were emphasized voluntary participation and the right to refuse to participate in the study and to withdraw at any time. Ethical approval were taken from Ethical Committee of Faculty of Nursing .

IV) Statistical analysis:

The data was entered and analyzed using IBM-SPSS Statistics for Windows, version 25.0. IBM Corp. Released in 2017. Armonk, NY: IBM Corp. Qualitative data was expressed as frequency and percentage. Initially the quantitative data was tested for normality using the Kolmogorov-Smirnov and Shapiro-Wilk test with data that is normally distributed if $p > 0.050$. Quantitative data was expressed as mean \pm standard deviation (DS) if normally distributed or median and interquartile range (IQR) otherwise.

III. RESULTS

Table (1): Distribution of study and control groups in relation to their socio-demographic characteristics (N = 80).

This table showed that about half of the study group (42.5%) and the control group (40%) was aged between 40 and less than 50 years. According to marital status, most of the two groups (65%) of the study group and (80%) of the control group were married. Regarding the level of education of patients, it was found that less than half of the study group (37.5%) and slightly less than half of control group (42.5%) were illiterate. As regards to patient occupancy, it was found that more than three quarters of the study and control groups (77.5%, 82.5%) were housewives.

This table did not show statistically significant differences between the two groups with respect to the socio-demographic parameters.

Table (1) Distribution of study and control groups in relation to their socio-demographic characteristics

Demographic data	Group study (n = 40)		Control (n = 40)		χ^2	P value	
	No	%	No	%			
Age	20- <30	5	12.5%	5	12.5%	0.070	0.995
	30- <40	6	15.0%	6	15.0%		
	40 -<50	17	42.5%	16	40.0%		
	50 - ≤60	12	30%	13	32.5%		
Marital status	Married	26	65%	32	80%	2.313	0.315
	Divorced	6	15%	3	7.5%		
	Widow	8	20%	5	12.5%		
Residence	Rural	21	52.5%	21	52.5%	0.000	1.000
	Urban	19	47.5%	19	47.5%		
Education	Illiterate	15	37.5%	17	42.5%	0.505	0.918
	Read & Write	7	17.5%	6	15%		
	Pre-University	9	22.5%	10	25%		
	University	9	22.5%	7	17.5%		
Job	Employee	9	22.5%	7	17.5%	0.315	0.854
	Housewife	31	77.5%	33	82.5%		
Work nature	Manual	30	75 %	33	82.5%	0.672	0.412
	Non manual	10	25 %	7	17.5%		

Data are expressed as frequency (percentage). P value by Chi-Square Test.

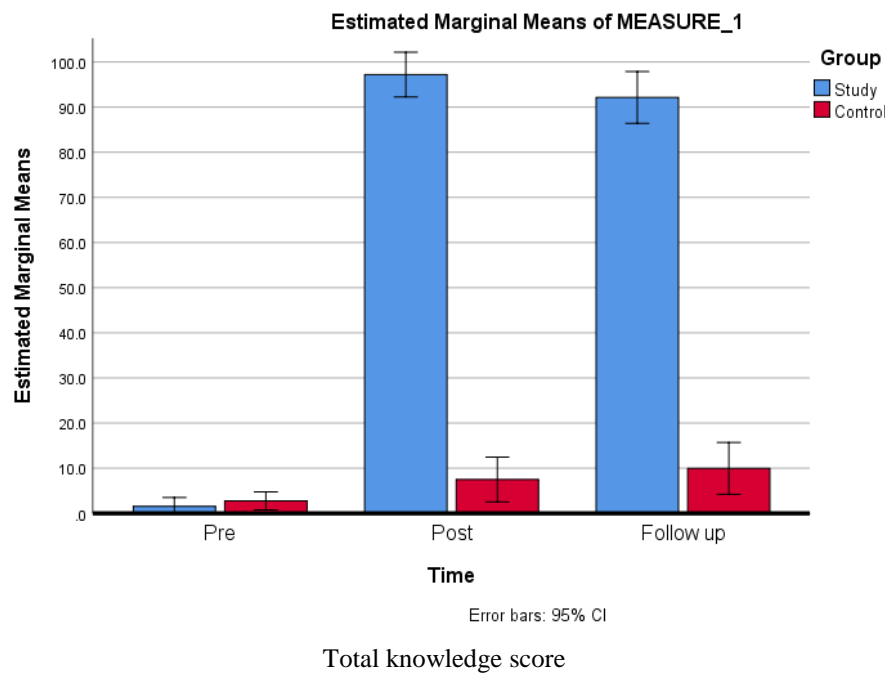


Figure (1): Comparison between the two groups in relation to their total knowledge score pre, post and at follow up after interventions (N=80).

This figure illustrated that there was highly statistical significance difference between study and control groups in relation to total knowledge score ($P < 0.0005$). This means that, the implementation of the educational interventions had a positive effect on improving patients’ knowledge.

Table (2): Comparison between study and control groups in relation to their upper extremity functional index (UEFI) and limitation regarding pre, post and at follow up after interventions (N=80).

This table showed that, overtime there was significantly increase in (UEFI) limitation mainly in control group not in study group. This table illustrated the group effect. There was change in control group rather than study group. Within groups there was significant change overtime, however there was significant interaction between time and group. This table also, illustrated that , the change overtime was affected by the group and, overtime there was no limitation in upper extremity functional index within the study group.

Table (2) Comparison between study and control groups in relation to their upper extremity functional index (UEFI) and limitation regarding pre, post and at follow up after interventions.

Measurement	Group		Within group Time effect		Group*Time effect		Between groups Group effect	
	Study	Control	F	P	F	P	F	P
UEFI %:								
Pre -intervention:	100±0	100±0						
Post intervention:	94±16	38.1±25.3	196.47	<0.0005	144.933	<0.0005	160.529	<0.0005
Follow up:	96.6±12.3	38.1±25.3						
UEFI limitation:								
Pre -intervention:	0±0	0±0						
Post intervention;	5.47±16	61.9±25.3	196.47	<0.0005	144.933	<0.0005	160.529	<0.0005
Follow up;	3.4±12.3	61.9±25.3						

Binary logistic regression analysis . P value < 0.0005

Table (3): Comparison between the two groups in relation to arm circumference measurements pre, post and at follow up after interventions (N=80).

This table showed that, overtime there was significantly increase in wrist and forearm measurements mainly in control group not in study group. This illustrated the group effect. There was change in control group rather than study group. Within groups there was significant changes overtime, however there was significant interaction between time and group. This table illustrated that the change overtime is affected by the group. This table also showed that, overtime there is no change in all arm measurement within the study group.

Table (3) Comparison between the two groups in relation to arm circumference measurements pre, post and at follow up after interventions.

Measurement	Group		Within group Time effect		Group*Time effect		Between groups Group effect	
	Study	Control	F	P	F	P	F	P
Wrist:								
Pre intervention:	-							
Post intervention:	11.1±2.6	8.1±0.9	17.599	<0.0005	17.599	<0.0005	35.565	<0.0005
Follow up:	11.1±2.6	8.8±1.3						
Forearm:								
Pre intervention:	-							
Post intervention;	14.4±2.98	11.9±1.1	32.702	<0.0005	30.016	<0.0005	15.482	<0.0005
Follow up	14.5±2.97	12.5±1.3						
Upper arm:								
Pre intervention:	-							
Post intervention:	20.3±15.3	15.7±1.3	188.719	<0.0005	146.034	<0.0005	1.392	0.242
Follow up	20.5±15.3	17.6±1.8						
Armpit:								
Pre intervention:	-							
Post intervention:	21.7±2.8	20.2±1.8	194.802	<0.0005	150.527	<0.0005	1.089	0.300
Follow up:	21.98±2.9	22.8±2.1						

P values by repeated measures ANOVA, P value < 0.0005

Table (4): Comparison between the two groups in relation to exercises performance post and at follow up after interventions (N=80).

This table showed that, majority of study group (97.5%) had good exercises performance level post and follow up intervention, respectively majority of control group (92.5%) had poor level of exercise performance post and follow up intervention. This means that, there was improvement of exercises performance post and at follow up after interventions of study group.

Table (4) Comparison between two groups in relation to exercises performance post and at follow up after interventions.

Group	Post			Follow up			*P value
	Poor No %	Fair No %	Good No %	Poor No %	Fair No %	Good No %	
study	1 2.5%	0 0%	39 97.5 %	0 0%	0 0%	40 100%	0.317
Control	37 92.5%	0 0%	3 7.5%	37 92.5%	0 0%	3 7.5%	1.000
**P-value	<0.0005			<0.0005			

P value by *Wilcoxon's signed ranks test and **Mann-Whitney U test. P value <0.0005

Table (5): Comparison between the two groups in relation to instructions compliance for arm lymphedema prevention post and at follow up after interventions (N=80).

This table showed that, majority of study group (87.5%, 92.5%) had good level regarding to instructions compliance for arm lymphedema prevention post intervention and at follow up. whereas majority of control group (90%) had poor level. This table also illustrated that the instructions of study group at post and follow up improved significantly after interventions implementation, where $P < 0.0005$. While there was slightly improvement of the control group post interventions and at follow up.

Table (5) Comparison between the two groups in relation to instructions compliance for arm lymphedema prevention post and at follow up after interventions.

Timing	Post			Follow up			*P value
	Poor No %	Fair No %	Good No %	Poor No %	Fair No %	Good No %	
Study	1 2.5%	4 10%	35 87.5%	0 0%	3 7.5%	37 92.5%	0.180
Control	36 90%	4 10%	0 0%	36 90%	4 10%	0 0%	1.000
**P-value	<0.0005			<0.0005			

P value by *Wilcoxon’s signed ranks test and **Mann-Whitney U test. $P < 0.0005$

Table (6): Comparison between the two groups in relation to presence of arm Lymphedema signs and stages post and at follow up after interventions (N=80).

This table illustrated that there was a statistically significantly higher proportion of lymphedema signs in control group as compared to intervention group (study group). in reference to redness and hotness, most of control group (87. 5% - 75%) had redness and hotness post and follow up and only 10% of study group had redness and hotness post intervention. In reference to swelling, most of control group (70%) had swelling at follow up. As regards to lymphedema stage, most of control group (70%) was at stage 0 at post- surgery and then at stage 1 at follow up and only (12.5%) of study group was at stage 0 post surgery and no signs for lymphedema at follow up post intervention.

Table (6) Comparison between the two groups in relation to presence of arm Lymphedema signs and stages post and at follow up after interventions.

Complication	Study control								P value
	Post (40)		Follow up(40)		Post(40)		follow up(40)		
	No	%	No	%	No	%	No	%	
Redness	4	10%	3	7.5%	35	87.5%	30	75%	<.0005
Hotness	4	10%	3	7.5%	34	85%	30	75%	<.0005
Numbness	0	0%	0	0%	8	20%	8	20%	<.0005
Tingling	0	0%	0	0%	30	75%	28	70%	<.0005
Tiredness	0	0%	0	0%	30	75%	30	75%	<.0005
Swelling	0	0%	0	0%	0	0%	28	70%	<.0005
Stage 0	5	12.5%	3	7.5%	28	70%	0	0%	<.0005
Mild stage	0	0%	0	0%	0	0%	28	70%	<.0005

Data are expressed as frequency (percentage). P value < 0.0005 by Chi-Square Test.

Table (7): Correlation between upper extremity functional index limitation (UEFI), exercises performance and instructions compliance for arm lymphedema prevention post and at follow up after interventions (N=80).

UEFI Limitation percent post – operatively had statistically significant very strong positive correlation with limitation at follow up and negative correlation with practice instructions post and exercises post and follow up. There was statistically

very strong negative correlation between instructions and exercises performance after interventions and upper extremity functional index limitation (post and follow up) mainly in control group not in study group.

Table (7) Correlation between upper extremity functional index limitation (UEFI), exercises performance and instructions compliance for arm lymphedema prevention post and at follow up after interventions.

	(UEFI)Limitation Post	(UEFI)Limitation follow up	lymphedema instructions post	lymphedema instructions follow up	Exercises post	Exercises follow up
Limitation post	-	0.982 (<0.0005)	-0.872 (<0.0005)	0.847 (<0.0005)	-0.898 (<0.0005)	-0.889 (<0.0005)
Limitation follow up	0.982 (<0.0005)	-	-0.861 (<0.0005)	-0.865 (<0.0005)	-0.882 (<0.0005)	-0.906 (<0.0005)
lymphedema instruction post	-0.872 (<0.0005)	-0.861 (<0.0005)	-	0.979 (<0.0005)	-0.875 (<0.0005)	0.872 (<0.0005)
lymphedema instruction follow up	-0.847 (<0.0005)	-0.865 (<0.0005)	-0.979 (<0.0005)	-	0.861 (<0.0005)	0.975 (<0.0005)
Exercises post	-0.898 (<0.0005)	-0.882 (<0.0005)	-0.875 (<0.0005)	0.861 (<0.0005)	-	0.975 (<0.0005)
Exercises follow up	-0.889 (<0.0005)	-0.906 (<0.0005)	0.872 (<0.0005)	-0.875 (<0.0005)	0.975 (<0.0005)	-

Pearson’s correlation test. Data are presented as r (= Pearson’s correlation coefficient) Ist row & p value in 2nd row)

IV. DISCUSSION

Regarding the age of the patients, the present study showed that, about less than half of the study and control groups were aged between 40 and <50 years and a minority was aged between 20 and < 30 years . These results are in agreement with Tsuchiya, et al. 2017 and Hamed, et al. 2019 who showed that, less than half of the studied patients were in the age group between 40 and <50 years and the minority of them was in the age group between 20 and < 30 years [7], [5]. These results also agree with Bokhari, Mehmood, Nazeer and Khan (2010), who presented that the average age of patients with mastectomy was (47.32 ± 13.53 years) [8]. In relation to marital status, the majority of patients in both groups were married, the minority was divorced and widowed. These results are in agreement with Hamed, et al. 2019 and Hawash, et al. In 2018 those who discovered that, the majority of patients in the control and study groups were married [5], [9].

As regards to education, less than half of the patients in the control and study groups were illiterate. This is in agreement with the results by Tsuchiya, et al. 2017 and Hamed, et al. 2019 which found that, about a third of the studied patients were illiterate [7], [5]. These results do not agree with the study by Hawash, et al. 2018 which revealed that, most study and control groups were illiterate [9]. These results also disagree with the study by Lee, et al. 2015 who represented, most of the patients had a university degree [10]. With reference to job status , over three-quarters of the patients in both groups were housewives .These results are in agreement with Pranjić, Gledo and Maleš-Bilić, 2014 who found that, over half of the studied patients were housewives [11].

Regarding to total patients’ knowledge, the study showed a significant statistical difference between the study and the control groups in relation to the total knowledge score and the implementation of the educational intervention had a positive effect on the improvement of patient knowledge. These results are in agreement with Bahgat, et al. 2016, who found that, most of the study group had little knowledge before the treatment protocol compared to the post-treatment

protocol and the level of knowledge of the study group improved significantly [12]. The study by Taha, Azeaz, Hassan and Shaban, 2013 revealed that, there was a great improvement in the total information of the patients with a statistically significant difference between study and control groups post and at follow up of program implementation

Concerning to upper extremity functional index (UEFI), the baseline of the study and control groups was similar, while the control group showed more upper extremity limitation post and at follow up measurements. These results are in agreement with Corrado, C. iardi, Servodio and Arpino, 2018, who reported that the home exercise program is an effective tool to prevent upper limb dysfunction in breast cancer survivors. Therefore, it should always be recommended to such patients, since it positively influences their quality of life and improves the function of the upper limbs [15]. The results of Sato, Ishida and Ohuchi, 2014, who measured arm function in a week, a month and three months after the operation, indicated that the educational program improved post-operative function and discomfort in the upper part of the arm in patients with breast cancer undergoing surgery compared to patients in the control group who received only routine treatments [16]. These results disagree with the results of El kateb, 1992 who found that, the majority in both groups reported a moderate to marked reduction in activities that may be related to the side effects of adjuvant therapy; Chemotherapy and radiotherapy which affect patients' general physical condition and interfere with self-care skills [17].

Regarding arm circumference measurements, this study showed that, over time, there was a significant increase in wrist and forearm circumference measurements in the control group and not in the study group. These results are in agreement with the results of Hawash, et al. In 2018, which showed that the mean circumferential differences of the arm increased in the control group, while in the study group there were no changes in the measurement of the arm from the beginning, after and during the follow-up until the end of the period of intervention [9]. In contrast, Sagen, Kåresen and Risberg, 2009, showed no statistically significant differences between the intervention group and the control group in the circumference of the arm or lymphedema at three and six months and two years after the intervention [24].

Regarding the fulfillment of the exercises, the present study indicated that, most of the patients in the study group showed a good performance of the exercises after and in the post-intervention follow-up, while most of patients in the control group showed poor performance of the exercises after and at follow-up after surgery. In turn, this means that the exercises taught are effective exercises, if practiced regularly by motivated patients, it help prevent lymphedema after mastectomy and improve wound healing. These results are also in agreement with the results of Taha, Azeaz, Hassan and Shaaban, 2013, which revealed that there was a statistical significance difference between the study and control groups in relation to the execution of the exercise after the program and after one month of program and there was an improvement in the study group instead of the control group after mastectomy [13]. These results disagree with the results of Benze and Oslen, 2002, who concluded that, early training compared to late onset (14 days) does not influence the incidence of postoperative lymphedema [18].

Regarding to the instructions compliance for the prevention of lymphedema of the arm, the instructions compliance of the study group post and at follow-up after the interventions improved significantly, while there was a slight improvement in the control group post and in the Follow -up after surgery. This may be due to the reinforcement of the patient, written instructions and the help of telephone monitoring in the prevention of lymphedema. These results came in the same line with Gautam, Maiya and Vidyasagar, 2011, who reported that, the intervention group met the instructions better than the control group during the next evaluation and after eight weeks and this helps to prevent the appearance of lymphedema in the study group [19]. These results are also in agreement with Lee, et al. 2015, which concluded that, adequate physical and psychological interventions, Providing precise instructions, information and safety of physical activity in a safe manner is necessary to prevent arm weakness and physical dysfunction in patients with BCRL [10].

Regarding the presence of lymphedema, there was a statistically significantly higher percentage of signs and stages of lymphedema in the control group than in the intervention group (study group). The results obtained are in agreement with Bahgat, et al. 2016, who found a significant difference between the control and intervention groups in relation to the elements of upper limb lymphedema and physical discovery; due to redness and stiffness of the skin, swelling, pain and tingling in the injured arm, lack of proximity to the joint movement process, lack of detailed flexibility of hands and wrists, tight clothing and injured arm sleeves and tight rings, bracelets and see on the injured arm, respectively [12]. These results also, are in agreement with Baumann, et al. In 2018, who reported that, there was a possible preventive effect of physical exercise on the appearance of lymphedema (signs and stage) [20]. Contrary to current findings by Paskett, et al.

2017, which found no difference in the incidence of lymphedema at eighteen months in breast cancer patients randomized to a physiotherapy intervention with educational materials compared to a check. Although poor adherence to surgery may have been a factor. These results, described by the researchers as "very disappointing", suggest that the exercises may not be able to prevent this common and problematic side effect of treatment, which affects up to half of breast cancer patients [21].

Regarding correlation between upper extremity functional index limitation (UEFI), exercises performance and arm lymphedema instructions post and at follow up after interventions.

The results obtained indicated strong negative correlation between exercises performance, instructions for arm lymphedema prevention (post and follow up) and upper extremity functional index limitation (UEFI), which means that when the patient obeys instructions which in turn, include exercise performance and other self-managements, she undergoes less function limitations or disability. These results are in agreement with Melam, Buragadda, Alhusaini and Arora, 2016, who discovered that the intervention group that implements exercises and instructions for the prevention of arm lymphedema showed an improvement in pain, in the function of the upper limbs, The abilities of the arm, shoulder, hand and limiting of the arm have decreased compared to the control group, since the recovery exercises and the home program led to a greater reduction of the edema of the limbs, the authors concluded that implementing intervention program (instructions and exercise) is an effective treatment to reduce post-mastectomy lymphedema [22]. These results are in contrast to Kilbreath, Ward and Lane, 2010 who found that , there was no significant improvement in upper limb strength between the two groups after exercises performance. Both groups reported few impairment , including swelling immediately after surgery and six months after surgery [23].

V. CONCLUSION

The results of the present study concluded that, most of the studied patients had little knowledge of arm lymphedema and the self-care practice about arm lymphedema prevention, which improved after the educational intervention to reach majority of studied patients had an adequate level of knowledge with significant differences between pre, post and follow-up after surgery. In contrast, most of the control group had a low level and still no changes before, after and during follow-up after surgery. Furthermore, most of the studied patients had good self-care practices after and in the follow-up after the surgery. Furthermore, disability and limiting of the arm were minimized during the following and follow-up periods. While most of the control group had poor self-care practices after and at follow-up, and disability and limiting of the arm increased after and at follow-up. It was concluded that the pre-discharge educational interventions had a positive effect on the knowledge and practice of self-care of women regarding the prevention of lymphedema in the study group than the control group after the intervention and after three months post- surgery.

VI. RECOMMENDATIONS

- Availability of a simple and guided instructional booklet for all women with breast cancer subjected to mastectomy to provide all the necessary information, in particular for the prevention of lymphedema.
- Carry out a complete health education program for women after breast cancer surgery to maintain good adherence to self-care practices and prevent complications, particularly lymphedema
- Increased awareness of nurses on the positive effect of the early exercises in the prevention of lymphedema of the arm
- The importance of the role of health professionals in the correct assessment of patients' situations and in the provision of explicit and relevant information should be emphasized, therefore more time should be devoted to transmitting information on postoperative care to patients.

For further research studies:

- Further studies should be carried about lymphedema prevention
- Replication and repeating the study using different and large sample size, to determine the generalizability of the results.

REFERENCES

- [1] **Hawash, M., Alaa-Eldeen, S., El Shatby, A., El Moghazy, H, Hamida, M. (2018)**, Effect of Nursing Rehabilitation Program on the Prevention of Lymphedema among Post Mastectomy Women. *Journal of Nursing and Health Science*; 7(6): PP 68-87.
- [2] **Saleh, H., Rageh, T., Alhassanin, S., & Megahed, M. (2018)**. Upper limb lymphedema related to breast cancer therapy: incidence, risk factors, diagnostic techniques, risk reduction and optimal management. *International Surgery Journal*;5(11):3633-3639.
- [3] **Sayegh, H., Asdourian, M., Swaroop, M., Brunelle,C., Skolny, M., Salama, L.,Taghian, A.(2017)**. Diagnostic Methods, Risk Factors, Prevention, and Management of Breast Cancer-Related Lymphedema: Past, Present, and Future Directions. *Curr Breast Cancer Rep*;9(2):111-121.
- [4] **Kayıran, O., Cruz, C., Tane, K.& Soran,A.(2017)**. Lymphedema: From diagnosis to treatment. *Turk J Surg*; 33(2): 51–57.
- [5] **Hamed, S., El-Etreby, R., Mahgoub, N., El-Boraie, O. & Esmail, M. (2019)**. Impact of Psycho-educational Program on Body Image Concerns and Mental Adjustment among Post Mastectomy Women. *International journal of Nursing Didactics*,;9(1), 48-57.
- [6] **National Lymphedema Network. (2017)**. www.lymphnet.org/https://www.inspire.com/groups/national-lymphedema-network/?ajax=1&page=8&snapshot=9te2q5JIMzEJKsqEHA0W6A.
- [7] **Tsuchiya, M., Masujima, M., Kato, T., Ikeda, S., Shimizu, C., Kinoshita, T., & Takahashi, M. (2019)**. Knowledge, fatigue, and cognitive factors as predictors of lymphoedema risk-reduction behaviours in women with cancer. *Supportive Care in Cancer*: 27(2), 547-555.
- [8] **Bokhari, I., Mehmood, Z., Nazeer, M., & Khan, A. (2010)**. Early Complications Of Mastectomy With Axillary Clearance In Patients With Stage II And III Carcinoma Breast. *Journal of Surgery Pakistan (International)*, 15(4), 182.
- [9] **Hawash, M., Alaa-Eldeen, S., El Shatby, A., El Moghazy, H, Hamida, M. (2018)**, Effect of Nursing Rehabilitation Program on the Prevention of Lymphedema among Post Mastectomy Women. *Journal of Nursing and Health Science*; 7(6): PP 68-87.
- [10] **Lee,D., Hwang,J., Chu I, Chang,H., Shim,Y. &Kim,J. (2015)**.Analysis of factors related to arm weakness in patients with breast cancer related lymphedema. *Support Care Cancer*. 23(8): 2297-2304.
- [11] **Pranjić, N., Gledo, I., & Maleš-Bilić, L. (2014)**. The Most Common New Cases of Breast Cancer among the Housewives: The Some Carcinogenic Determinants. *Macedonian Journal of Medical Sciences*; 7(2):346-351.
- [12] **Bahgat, Z., Alaa Elden, S., Atia, N., El Shikh, E., & Elshemy, M. (2016)**. The Efficacy of Protocol of Care on Post Mastectomized Women Outcomes. *IOSR Journal Of Nursing And Health Science*, 5(5), 49-64.
- [13] **Taha, N.,Azeaz,M., Hassan, A.&Shaban, A.(2013)**. Effect of Educational Program Regarding Therapeutic Exercises on Women's Pain, Fatigue and Shoulder Function Undergoing Mastectomy. *Journal of American Science*;9(3)
- [14] **Brewster, A. M., & Parker, P. A. (2011)**. Current Knowledge on Contralateral Prophylactic Mastectomy Among Women with Sporadic Breast Cancer. *The Oncologist*, 16(7), 935-941.
- [15] **Corrado, B., Ciardi, G., Servodio, C., & Arpino, G. (2018)**. Home Exercise Program is an effective tool in improving upper limb function and quality of life in breast cancer survivors: A retrospective observational study. *Lymphatic Research and Biology*;14) 3.
- [16] **Sato, F., Ishida, T., & Ohuchi, N. (2014)**. The perioperative educational program for improving upper arm dysfunction in patients with breast cancer: a controlled trial. *The Tohoku journal of experimental medicine*;232(2):115-122.

- [17] **El kateb, N.(1992)**. The impact of rehabilitation program upon occurrence of physical problems and adjustment among Egyptian mastectomy patients. Doctorate thesis, Cairo university.
- [18] **Benze,I.,&Oslen,M.(2002)**.Evaluation of immediate versus delayed shoulder excercises after breast cancer surgery including lymph node dissection- a randomized controlled trial. *The Breast,11(3)*, 241-248.
- [19] **Gautam, A., Maiya, A. & Vidyasagar, M. (2011)**. Effect of home-based exercise program on lymphedema and quality of life in female postmastectomy patients: pre-post intervention study. *Journal of Rehabilitation Research & Development*; 48(10), 1261-1270.
- [20] **Baumann, F. T., Reike, A., Hallek, M., Wiskemann, J., & Reimer, V. (2018)**. Does exercise have a preventive effect on secondary lymphedema in breast cancer patients following local treatment-a systematic review. *Journal of Breast care*, 13(5), 380-385.
- [21] **Paskett, E., Le-Rademacher, J., Oliveri, J., Liu, H., Seisler, D.,Sloan, J., & Unzeitig, G. (2017)**. Prevention of lymphedema in women with breast cancer (BC): Results of CALGB (Alliance) 70305.
- [22] **Melam, G., Buragadda, S., Alhusaini, A., & Arora, N. (2016)**. Effect of complete decongestive therapy and home program on health-related quality of life in post mastectomy lymphedema patients. *BMC women's health*;16(1): 23.
- [23] **Kilbreath,S., Ward, L& Lane, K.(2010)**. Effect of air travel on lymphedema risk in women with history of breast cancer. *Breast Cancer Res Treat*;120(3):649–654.
- [24] **Sagen,A., Kåresen,R.& Risberg,M.(2009)**. Physical activity for the affected limb and arm lymphedema after breast cancer surgery: A prospective, randomized controlled trial with two years follow-up. *Acta Oncologica*;48:1102–1110.
- [25] **Smoot, B. J., Wong, J. F., & Dodd, M. J. (2011)**. Comparison of diagnostic accuracy of clinical measures of breast cancer–related lymphedema: area under the curve. *Archives of physical medicine and rehabilitation*, 92(4), 603-610.
- [26] **Ancukiewicz, M., Miller,C., Skolny, M., O'Toole, J., Warren,L., Jammallo, L., Specht, M.,& Taghian, A.(2012)**. Comparison of relative versus absolute arm size change as criteria for quantifying breast cancer-related lymphedema:.*Breast Cancer Res Treat*;135(1):145-52.
- [27] **Stratford et al (2001)**: Development and initial validation of the upper extremity functional index. *Physiotherapy Canada* 53 (4): 259-67.Minimum detectable change (90% confidence): 6 points.
- [28] **Mahdy, N., & Ali, R. (2012)**. Effect of Pre-discharge Guidelines on Women's Knowledge and Self-Care Practices Regarding Arm Lymphedema Prevention Post mastectomy. *J Am Sci*; 8(12): 1003-1017.