Effect of Nursing Program on Patients' Knowledge and Self-Care Strategies regarding Lymphedema Prevention Post Mastectomy

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Abstract

Background: Breast cancer related lymphedema is the most common serious complication resulting from breast cancer treatments that augment the incidence of lymphedema post mastectomy. **Aim:** To evaluate the effect of nursing program on patient's knowledge and self- care strategies regarding lymphedema prevention post mastectomy. **Design:** A quasi-experimental, pre-test and post-test intervention study design was implemented to achieve the aim of the current study. **Setting:** The study was conducted in general surgery department and oncology department affiliated to Benha University Hospital, Qalyubia Governorate, Egypt. **Sample:** A purposive sample consisting of 60 women post-mastectomy participated in the current study. **Tools:** Tool (1) Post mastectomy patients' assessment interview questionnaire: It includes three parts: Part (I) Patients' personal data, Part (II) Patients' medical and surgical data, and Part (III) Patients' knowledge assessment. Tool (II): Part (I) Patients' self-care strategies observational checklist (applied pre/post program implementation), Part (II) Self-reported instructions for arm lymphedema prevention. Tool (III): Patients' lymphedema assessment scale: It include three parts: Part (I) Assessment presence of lymphedema & numerical pain scale, Part (II) Arm girth measurement scale and Part (III) the upper extremity functional index. **Results:** One third of study patients had acute lymphedema immediately post mastectomy and there was positive correlation between patients' overall variables and their self-reported instructions for lymphedema prevention pre as well as post program implementation and before and after mastectomy also at follow-up of program in 2 weeks, 3 months, and 6 months. **Conclusion:** Overall, most of study patients didn't develop breast cancer related lymphedema by 3 months and 6 months follow up after implementation of self-care educational program. Moreover, there was a highly statistically significant difference of studied patients' total knowledge, learned exercises and self-reported instructions post implementation of educational program. **Recommendations:** The study should be replicated on a large sample size at different settings in Egypt to generalize the results.

Keywords: Lymphedema prevention, Nursing program, Post mastectomy, Patients' knowledge and self-care strategies.

Introduction

Breast Cancer-Related Lymphedema (BCRL) is a negative sequela of Breast Cancer (BC) treatment. BCRL affects approximately 1 in 5 patients treated for BC, and it has a significant negative impact on patients' life after BC treatment. Because of increasing rates of early detection of BC due to screening as well as improvements in treatment outcomes, long-term BC survivorship continues to increase. However, with improved survivorship and the use of multimodality treatment paradigms, comes the potential for an increased incidence

of long-term complications of treatment, including BCRL **(Smile et al., 2018).**

Lymphedema impacts on average 21% of BC patients, although incidence rates can range from 2% to 65% depending on surgical, radiation, and systemic therapy treatment decisions as well as patient specific factors. More aggressive local therapy (mastectomy vs. breast conservation), axillary surgery (axillary dissection vs. sentinel node biopsy), radiation therapy (regional nodal irradiation), and use of systemic therapies are all associated with increased risk of BCRL. The incidence of BCRL to be 10% to 40% with regional nodal irradiation and 10% to 50% with axillary dissection **(Smile et al., 2018).**

Lymphedema characterized by an accumulation of protein-rich lymphatic fluid causing swelling of the upper extremity secondary to interruption of the lymphatic vasculature **(Gillespie et al., 2018).** Patients with BCRL in the early stages of the condition may report symptoms, such as sensation of arm fullness and mild discomfort. In later stages may experiencing multiple symptoms, vary from swelling, heaviness, tightness, firmness, stiffness, into limb weakness, and impaired limb mobility of shoulder, arm, elbow, wrist, and fingers at the affected side **(Fu, 2014).**

The International Society of Lymphology (ISL) stage lymphedema as follows: latent stage (= stage 0): no visible or palpable edema, stage I: depends on load, spontaneously reversible, soft and deeply pitting edema, stage II: spontaneously irreversible, hard, flat pitting, Stemmer's sign positive, and stage III: irreversible, skin changes, reduced immune defense of the skin **(Aoishi et al., 2020).**

Patients have lifelong risk of developing BCRL. For prevention, early detection and management of lymphedema nurses should educate BC survivors to follow self-care regimen or strategies for controlling symptoms and avoiding exacerbation of the condition. Nurses in oncology and surgical departments are essential members of the interdisciplinary team in prevention and the management of LE post mastectomy. They are involved in cancer rehabilitation and providing comprehensive assessment and early intervention, coordinating appropriate referrals to interdisciplinary team members for LE management **(Kim, 2020).**

Nurses should educate BC survivors to follow self-care regimen recommendations include performing daily skin care, wearing gloves during activities to prevent skin breaks, preventing injury in the affected side, preventing muscle strain, and promoting lymph drainage (i.e., elevate the affected arm, engage in regular, light aerobic exercise daily, maintain optimal body weight, and wear a well-fitted compression garment when traveling by air) **(Ostby et al., 2014).**

Breast cancer is the most common malignant tumor in women, with an incidence of 2,261,419 new cases worldwide in 2020, accounting for 24.5% of cancer diagnoses in females **(Virani et al, 2021).** Average survival rates for women with non-metastatic invasive breast cancer are 91% at 5 years and 84% at 10 years. In addition to**,** it was observed that mastectomy surgery is the commonest operation due to malignant neoplasm among Egyptian females with increasing rate, approximately 29%. Despite its high prevalence and incidence, mortality rates for breast cancer have declined by about 35% over the last 3 decades **(American Society of Clinical Oncology, 2020)**.

Aim of the study:

This study was done to evaluate the effect of nursing program on patients' knowledge and self-care strategies regarding lymphedema prevention post mastectomy.

Study hypotheses:

H1: The mean scores of patients' knowledge and self-care practices post implementing self-care strategies for prevention of lymphedema post mastectomy will be higher than their scores pre implementation of the nursing program.

H2: There will be a significant positive correlation between patients' knowledge, self-care practices and prevention of lymphedema post mastectomy.

H3: The mean scores of assessment for preventing or reducing incidence of lymphedema post mastectomy during the follow up period will be higher than their scores pre implementation of the nursing program**.**

Subject and methods

Study design:

A quasi-experimental pre and post intervention research design was implemented to achieve the aim of the present study.

Study setting:

The study was conducted in general surgery department and oncology department affiliated to Benha University Hospital, Qalyubia Governorate, Egypt.

Sample:

A purposive sample consisting of 60 conscious women aged from 30 to less than or equal 65 years old, with unilateral lymph node dissection or biopsy and/or exposed to radiation therapy post-mastectomy in the above-mentioned setting participated in the current study.

Women who had bilateral lymph node dissection or biopsy, upper limb cellulitis, and congenital lymphedema were excluded from this study.

Data collection tools:

Three tools were used to collect data to fulfill the study's aim as following:

Tool (1): Post mastectomy patients' assessment interview questionnaire:

This tool was designed by the researcher in English language based on reviewing the related recent literature and scientific references. It was reviewed from **Norman et al., (2010) & Lee et al., (2015).** It included three parts as the following:

Part (I): Patients' personal data:

This part used to assess patients' personal data which involved (9) questions included the following items age, level of education, occupation, marital status, number of children, patients' monthly income and housing, patients' phone number and residence.

Part (II): Patients' medical and surgical data:

This part includes the following 5 sections including patients' present clinical data**,** patients' present medical problem and complaint (pathological parameters), patients past medical history, patients past surgical history and patients' family history.

Part (III): Patients' knowledge assessment:

This part concerned assessing patients' knowledge regarding BCRL instructions and self-care strategies. It consisted of (57) questions yes and no. The responses were either″ yes″ or ″no″, the correct answer was ″ one score″ while the wrong one was ″zero″. The scores of each statement for every section were summed up giving a total score for every section, then the total score for all the knowledge questionnaires were calculated. Patients' knowledge was categorized according to statistical analysis into satisfactory and unsatisfactory, as follows:

- ≥ 70 % was considered satisfactory.

- < 70% was considered unsatisfactory.

Tool (2): Patients' self-care strategies observational checklist (pre/post program implementation):

This tool is written in Arabic language. It was used before/after implementing the educational program for lymphedema prevention post mastectomy to assess the patient ability to practice learned exercises correctly and follow self-care strategies to prevent lymphedema post mastectomy. It was adapted from **Fu et al., (2016), Douglass et al., (2019) and Deveci et al., (2020).** This tool includes two parts patient's self-care strategies observational checklist (exercise performance) and self-reported instructions for arm lymphedema prevention.

Tool (3): Patients' lymphedema assessment scale:

This tool is used to assess the patient presence of post mastectomy related lymphedema after implementation of the patient educational program. This tool written in English language. It includes three parts: Assessment presence of lymphedema & Numerical pain scale, Arm girth measurement scale, and The Upper Extremity Functional Index (UEFI).

Educational program booklet regarding prevention of lymphedema post mastectomy:

The educational booklet designed by the researcher in Arabic language based on reviewing the related recent literature and scientific references from **Dollar, (2013) & Simonavice, Kim, & Panton, (2016) & Douglass et al., (2019)**. It aimed to improve patients' knowledge about breast cancer, breast cancer related lymphedema and self-care practices to prevent breast cancer related lymphedema.

Content validity and reliability:

Tools validity: The face and content validity of the tools were checked through a jury consisting of (5) experts; (3) in the field of Medical Surgical Nursing, (2) professors and (1) assistant professor from the faculty of nursing, Benha University and (1) medical consultant in the field of Oncology Nursing from the oncology department at Beni-suef University Hospital and (1) in the field of physiotherapy from the Faculty of Physiotherapy at Beni-suef University. The experts reviewed the tools for clarity, relevance, comprehensiveness, simplicity and appropriateness.

Reliability of tools: All tools of the study were tested statistically for its reliability, and it was evaluated using test-retest method. The Cronbach's alpha test which is used to measure the internal consistency. The reliability scores of the tools were r coefficient (r= 0.83) for tool I; (r= 0.87) for tool II, and (r= 0.88) for tool III, which denotes the high internal consistency of the used tools.

Ethical consideration:

The research approval obtained from the ethical committee in Faculty of Nursing, Benha University before starting the study. An official letter was issued from the faculty of nursing, Benha University to the medical and nursing directors of surgical and oncology departments affiliated to Benha University Hospital explaining the purpose of the study and requesting the permission for data collection from the study group. The researcher clarified the objectives and aim of the study to patient before obtaining their consent to participate in the study. The researcher assured maintaining anonymity and confidentiality of subjected data.

Pilot study:

A pilot study was conducted on 10% of the study patients (6 patient with BCRL) in

order to test the clarity and applicability of the study tools and the program, also to estimate the time required for each tool to be filled in as well as to identify any possible obstacles that may hinder data collection. Based on the results of the pilot study the necessary modifications were done to have more applicable tools for data collection. Patients selected for the pilot study were excluded from the study patients.

Field work:

The collection of data and application of educational instructions lasted over a period of six months; starting at February 2021 and ending in august 2021. The precautionary practices measure due to the spread of the Corona virus, infection control was taken as maintaining physical distance, wearing facemask, gloves, and using alcohol aseptic solution for both the researcher and the patients included in the study.

The program was conducted in three phases:

Assessment and planning phase.

The researcher visited the surgical and oncology departments three days in Saturday, Sunday, Monday during morning shifts (9.00 am to 2.00 pm). The patient who fulfilled the inclusion criteria was selected. The researcher obtained the patient's oral consent for participating in this study after explaining the aim of the study. Filling in the previously mentioned tools was done by the researcher before implementation of the educational instructions.

These tools were completed within an average time 60 to 90 minutes. The researcher set up teaching plan covering all objectives and prepared the nursing program according to patients' needs. These objectives were categorized into general and specific objectives. The instructions resources and facilities were allocated (printed material and location of session that best serve the learners).

The researcher determined the timetable of sessions, teaching methods, media used and learner's activities. After data collection, the appointment for starting instructions sessions was detected and scheduled with the patient for the following days.

Implementation phase (The program implementation):

The teaching sessions were conducted in patient rooms at the surgical and oncology departments. The patient rooms were quiet, had adequate lighting, well ventilated and had adequate spacing for implementing of educational instructions activities. Total number of the sessions of educational instructions was 5 sessions. Each session of them had taken one and half hour/ day for 3 days per week Saturday, Sunday, and Monday.

These sessions were conducted for small group; each group number didn't exceed five women. The booklet was given for every woman. Implementation of educational program lasted over a period of 5 weeks for each woman. Different teaching and learning methods were used during the sessions which included; discussion, demonstration and re-demonstration, instructional media include mobile videos and printed handout with pictures, which was presented in clear and concise form to improve learning ability of the women.

Each session started by greeting the patient, assessing women motivation for learning and using simple language to suit the educational level of the women.

Theoretical sessions were carried out 5 sessions. They include the following:

The first session: (Introductory session)

At the beginning of the first session an orientation of educational program and its purpose took place and motivate patients to follow strategies, which included in it. The researcher emphasized the importance of adherence to each step of educational program, and the rationale for and the benefit of engaging in each new behavior was explained.

The second session:

This session included knowledge about the definition of BC, sign and symptoms of BC, types and treatment modalities used and types of mastectomies performed ended with the possible complications of mastectomy.

Third session:

This session concerned with BCRL knowledge including lymphatic system and its importance and function, definition of lymphedema, causes of LE, signs and symptoms of LE, types and its complications.

Fourth session:

This session concerned with self-care instructions regarding general practices to prevent BCRL, skin care, and wound care and sign and symptoms of wound infection, healthy nutrition, controlling of pain, and when to call a doctor.

Fifth session (practical session):

This session concerned with teaching patient how to preform home exercises of hand and arm to prevent BCRL were conducted under the instruction of physiotherapists and after reviewing of the related literatures.

Evaluation phase

The evaluation phase emphasized on determining the effect of the educational program on knowledge and self-care practices for prevention of BCRL through pre/post assessment using the previously mentioned tools, concerning knowledge using (part III: Patient's knowledge assessment in tool I), was assessed pre and immediately after implementation of the educational program and learned self-care practices and instructions was assessed pre and immediately post implementation of the educational program by using tool II as well as follow up with the patient for assessing incidence of lymphedema before and immediately after mastectomy [Immediately post-test was performed after implementing the program preoperatively (following the teaching session)] and at 2 weeks, 3 months, 6 months intervals incidence of lymphedema by using tool III and comparing the collected data before and after application of educational instructions.

Statistical analysis:

The data were collected, coded and entered into a suitable excel sheet. The collected data were organized, analyzed using appropriate statistical significance tests. The data were collected and coded using the Computer Statistical Package for Social Science (SPSS), version 21, and was also used to do the statistical analysis of data. Data were presented using descriptive statistics in the form of frequencies and percentages. A Chi-square, Paired t-test, ANOVA, and Pearson correlation tests were used to compare frequencies between study variables.

Degrees of the significance of results were considered as follow:

- P-value > 0.05 Not significant (NS)
- P-value ≤ 0.05 Significant (S)
-P-value ≤ 0.01 Highly Significant (HS)

Results:

Table (1): Shows that 33.4% of the studied patients' aged between 50 to less than 60 years old with Mean±SD for the age was 48.37±10.21; also 60% of them were married and 41.7% were employees. As well, 30% of them had middle education. It was observed that 55% of the studied patients had not

enough monthly income and 63.3% lived in rural areas. Moreover, 78.3% and 80% of them had a good ventilated home and sewage.

Figure: (1) Illustrates that, there was a marked improvement in studied subjects' total knowledge post implementation of educational program with highly statistically significant difference between pre and post implementation of the program as their mean pre implementation was 6.60±3.29 while, improved to become as observed 51.33±3.05 post implementation of educational program.

Figure (2): Illustrates that, there was a marked improvement in total score of learned exercises among studied patients post implementation of self-care educational program with highly statistically significant difference between pre and post implementation of the program as their mean pre implementation was 18.22±0.56 while, improved to become as observed 23.70±4.26 post implementation of educational program.

Table (2): Shows that overall patients' self-reported instructions mean scores regarding for lymphedema prevention was 6.07±3.25 pre implementation the program while instructions increased to 43.23±6.35 post the program with highly statistically significant difference between total score of self-reported instructions pre and post implementation of self-care educational program among studied patients at (P=≤ 0.001**).

Figure (3): Illustrates that, there was a markedly decrease in lymphedema by 6 months follow-up as was observed their main pre implementation of self-care educational program was 3.6±4.35 and after mastectomy mean was 6.5±3.27; while, their mean by 6 months follow up after implementation of educational program was 0.22±0.74.

Figure (4): Illustrates that, 71.7% of total studied patients' arm girth measurement before mastectomy was at stage 0 of lymphedema; while, 38.8 % of them were in stage 1 of lymphedema after mastectomy. Also, it was observed that 100.0 % of the studied patients at stage 0 of lymphedema by 6 months follow up after implementation of self-care educational program.

Table (3): Shows that, there were highly statistically significant differences between total score of Upper Extremity Functional Index (UEFI) assessment of lymphedema among studied patients pre and post implementation of self- care educational program that assessed at frequent intervals before mastectomy and immediately after mastectomy, and at follow-up of program in 2 weeks, 3 months, 6 months which indicates marked decrease in lymphedema at (p= ≤0.001**).

Table (1): Number and percentage distribution of patients according to their personal data (n=60).

Patients' personal data	No.	%
Age/year:		
30< 40	14	23.3
40 < 50	14	23.3
50 < 60	20	33.4
60 ≤65	12	20.0
Mean±SD	**48.37±10.21**	
Education:		
Illiterate	15	25.0
Read and write	16	26.7
Middle education	18	30.0
Higher education	11	18.3
Occupation:		
Doesn't work	17	28.3
Manual work	18	30.0
Employee	25	41.7
Marital status:		
Single	0	0.0
Married	36	60.0
Divorced	6	10.0
Widow	18	30.0
Residence:		
Rural	38	63.3
Urban	22	36.7
Children:		
None	8	13.3
One child	14	23.4
Two children	11	18.3
Three children	18	30.0
≥ Four Children	9	15.0
Monthly income:		
Not enough	33	55.0
Enough	27	45.0
Housing condition		
Good ventilation:		
Yes	47	78.3
No	13	21.7
High floor:		
Yes	17	28.3
No	43	71.7
Sewage:		
Yes	48	80.0
No	12	20.0

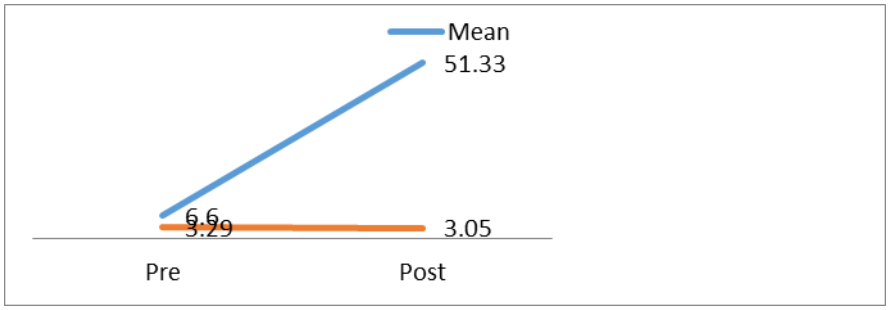

Figure (1): Total knowledge mean scores among studied patients pre and post nursing program implementation (n = 60)

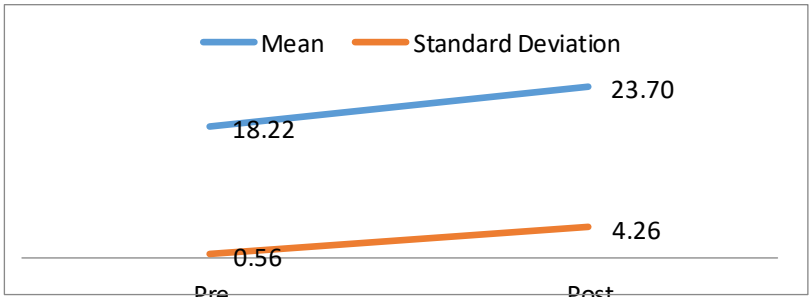

Figure (2): Total score of learned exercises mean among patients pre and post nursing program implementation (n = 60)

Table (2): Number and percentage distribution of the studied patients regarding total score of self-reported instructions for lymphedema prevention pre and post self-care educational program implementation (n=60)

Total self-reported instructions	Pre–program		Post–program		t test	Sig.
	No.	%	No.	%		
Poor practice	60	100.0	0	0.0	116.000	0.000**
Moderate practice	0	0.0	8	13.3		
Good practice	0	0.0	52	86.7		
Range	**0-13**		**26-50**			
Mean±SD	**6.07±3.25**		**43.23±6.35**		-42.745	0.000**

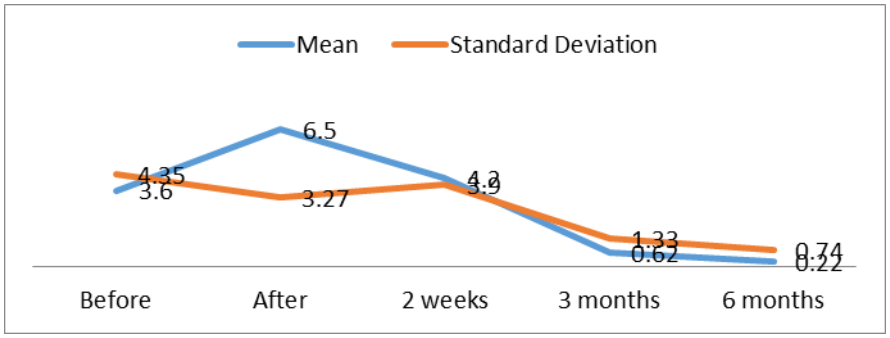

Figure (3): Mean score of patients' lymphedema assessment among studied sample (n = 60)

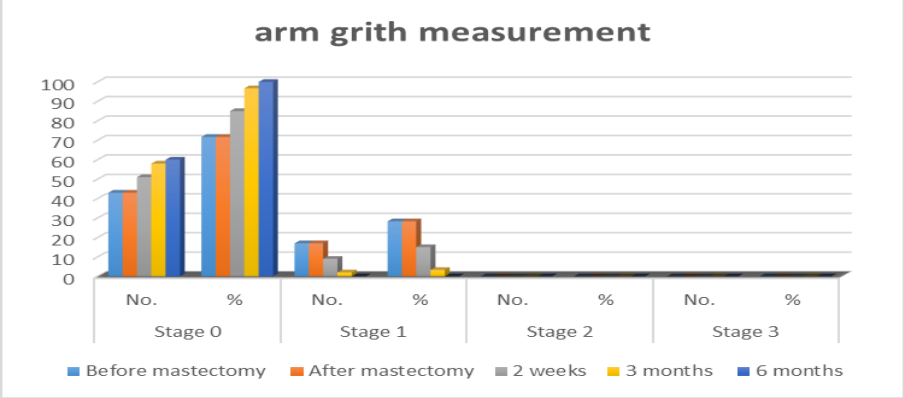

Figure (4): Number and percentage distribution of total score of arm girth measurement scale among studied patients.

Table (3): Distribution of the studied patients' total score regarding Upper Extremity Functional Index (UEFI) assessment of patients' lymphedema pre and post implementation of the program (n = 60)

Time	Range Mean±SD	Upper Extremity Functional Index (UEFI)						t test	Sig.
		Mild function		Moderate function		Full function			
		No.	%	No.	%	No.	%		
Before mastectomy	40-80 75.33±11.48	0	0.0	7	11.7	53	88.3	-	-
After mastectomy	0-40	44	73.3	16	26.7	0	0.0	28.891 [a]	0.000**
2 weeks follow-up	21.03±13.89 0-60	17	28.3	43	71.7	0	0.0	-23.325 [b]	0.000**
3 months follow-up	38.83±15.93 56-80	0	0.0	15	25.0	45	75.0	-25.127 [c]	0.000**
6 months follow-up	73.73±8.04 72-80	0	0.0	0	0.0	60	100.0	-6.299 [d]	0.000**
F (Sig.)	79.02±1.97							315.492	0.000**

Discussion

The results of the present study showed that, the mean of the studied subjects' age were 48.37±10.21. This finding showed more than one third of the studied patients their age ranged between fifty to less than sixty and nearly one quarter of the studied subjects' their age ranged between forty to less than fifty. This could be explained in light of the known fact that cancer occurs with old age and higher risk for lymphedema development.

This finding is consistent with what was reported by **Temura & Kapucub, (2019)** who found in their study entitled "The effectiveness of lymphedema self-management in the prevention of breast cancer-related lymphedema and quality of life: A randomized controlled trial" which carried out in a state university, the Adult Hospitals General Surgery Department that the mean of their studied subjects' age were 47,6 ± 8,96 and more than one third of their study subjects aged between 43-51.

This result disagreed with what was reported by **Iyigun et al., (2016)** in study titled "Preoperative Lymphedema-Related Risk Factors in Early-Stage Breast Cancer" conducted at Istanbul Florence Nightingale

Hospital, Breast Health Center, between 2012 and 2015 that There was no statistically significant difference in the lymphedema rates between the <65 and >65 age groups.

Concerning the educational level, the results of the present study showed that, one quarter of the study subject were illiterate and slightly less than one third of them were middle education. This clarified decrease the studied subjects knowledge level regarding breast cancer, its' complications, treatment modalities used, breast cancer related lymphedema and its prevention measures.

This finding contradicted with what was reported by **Kilbreath et al., (2016)** who found in study titled "Risk factors for lymphedema in women with breast cancer: A large prospective cohort" conducted at Emergency Clinical Hospital, Galati, Radiotherapy and Oncology Department that two third of their study subjects were highly educated and one third of them were middle education.

Concerning subjects' occupation, and marital status the results of the present study showed that, near one third of the study subjects had manual work, and near half of them were employed. In addition to, more than half of them were married.

This finding are contradicted with what was reported by **Kilbreath et al., (2016)** who's results showed near half of their study subjects not work and near one third of them had part time work. In the same line with marital status as their study subjects showed that two third of them were married.

Regarding to study subjects' children, the results showed that more than two third of the study subjects had children and near one third of them had three children.

This finding supported with what was reported by **Cansız et al., (2022)** who revealed in study titled "The effect of a self-management lymphedema education program on lymphedema, lymphedema-related symptoms, patient compliance, daily living activities and patient activation in patients with breast cancer-related lymphedema: A quasi-experimental study" which conducted at a lymphedema center of a university hospital in Ankara, Turkey that more than two third of their study subjects had children and more than half of them the age of their children more than 20 years.

Concerning subjects' residence, the results of the present study revealed near two third of study subjects come from rural areas. Being from rural area increasing the risk of lymphedema post mastectomy because of low level of education, low income or monthly income irregular, no sewage at homes and most of them have manual work as assisting in farming with house work all of this make them had low knowledge and awareness about breast cancer, it's line of treatment, it's possible complications and self-care practices and prevention strategies.

This finding contradicted with what was reported by **Sherman et al., (2015)** who clarified in study titled "Factors predicting adherence to risk management behaviors of women at increased risk for developing lymphedema" conducted at the Fox Chase Cancer Center breast clinic that three fourth of their study subjects come from urban areas.

Also, this finding not supported with what was reported by **Chung et al., (2021)** who found in study titled "Impact of radiation dose on complications among women with breast cancer who underwent breast reconstruction and post-mastectomy radiotherapy: A multi-institutional validation study" conducted at 15 institutions between 2015 and 2016 was conducted after approval from the review board of the Korean Radiation Oncology

Group (KROG 18e04) that most of the study subjects were from Metropolitan.

In relation to patient monthly income, the results of the present study illustrated that, more than half of the study subjects had low monthly income. This finding showed that there is increasing the risk of breast cancer survivor to develop breast cancer related lymphedema which is associated with low awareness, low possibility of getting a healthy diet and follow instructions and exercises post mastectomy.

This finding agreed with **Flores at el., (2020)** who reported in study titled "Lymphedema Signs, Symptoms, and Diagnosis in Women Who Are in Minority and Low-Income Groups and Have Survived Breast Cancer" that more than two third of them were Africans with low income and concluded that Women who were African American or had a low income and had survived breast cancer had a greater burden of BCRL signs and symptoms than women who were white. The lack of a strong association between BCRL signs, symptoms, and diagnosis suggests that BCRL may be underdiagnosed. These findings suggest that more rigorous screening and detection of BCRL—especially for women who are African American or have a low income—may be warranted. Cancer rehabilitation programs may be able to fill this gap.

Regarding to subjects' housing condition, the present study showed that more than two third of studied subjects had a good ventilated home and their home not in high floors in addition to the most of them had sewage in their home. According to these finding a good sewage, ventilated and low floor homes decreased the risk of lymphedema post mastectomy as subjects living in a healthy environment that not burden the risk of lymphedema.

This finding was supported with **Kilbreath et al., (2016)** who reported in study entitled "Effect of air travel on lymphedema risk in women with history of breast cancer" conducted at health care center, Canada that most of their patients had a sedentary life style and with assessing them with air-plane traveling or living in a high floor apartments showed no effect on lymphedema incidence and explained that the changes in cabin pressure or living in skyscraper might influence the movement of fluid in the lymphatic system. Because lymph nodes drain this fluid, the thinking goes, it could more easily accumulate in a person's affected arm.

Regarding total knowledge of the studied subjects, the present study showed that most of subjects total knowledge before implementation of the educational program unsatisfied and after implementation of the educational program most of them showed high satisfaction level of knowledge. Main while, the results revealed that there was highly statistical significant differences between studied patients' satisfactory knowledge level about self-care pre and post implementation of self-care educational program.

This finding was in the same line with **Cansız et al., (2022)** in addition to **Sherman et al., (2015)** who reported in study titled "Factors predicting adherence to risk management behaviors of women at increased risk for developing lymphedema" conducted at the Fox Chase Cancer Center breast clinic.

Similarly with **Sherma & Koelmeyer, (2011)** who assured in study titled "The role of information sources and objective risk status on lymphedema risk-minimization behaviors in women recently diagnosed with breast cancer" which conducted at a hospital in Sydney, Australia that emphasized knowledge was high and increased over time.

Lymphedema information from the clinic (e.g., brochures, nursing staff) was the most cited source. Adherence to recommendations was moderate; non adherence was mostly for behaviors requiring regular enactment. Regression analysis revealed that only receipt of information from nursing staff and lymphedema knowledge three months after surgery were significant predictors of risk-minimization behaviors for BCRL. All of them emphasized that women who had sufficient knowledge about BCRL were more likely to adhere to recommended self-management of lymphedema (SML) strategies.

Moreover, **Brown et al., (2014)** reported in study titled "Prescription and adherence to lymphedema self-care modalities among women with breast cancer-related lymphedema" who emphasized that knowledge, belief and self-efficacy were more important indicators of self-management of lymphedema than demographic or clinical characteristics of studied subjects.

Concerning study subjects learned exercises, the present study revealed that most of study subjects had poor practice of exercises pre implementation of self-care educational program and showed moderate practice post implementation of self-care educational program. The current study showed highly statistical significant difference between total score of learned exercises pre and post implementation of self-care educational program among studied subjects.

This result was congruent with **Brown et al., (2014)** who's finally, reported that the study finding consistent with the clinical guidelines, as the majority of participants were prescribed compression garments effective by 84 %, bandages effective by 60 %, and physical therapy exercises effective by 55 %.

This result is contradicted with **Cormie et al., (2011)** who illustrated in study titled "The impact of high vs. low intensity resistance exercise on lymphedema status and severity of symptoms" conducted at Charles Gairdner Hospital, Australia that No change in lymphedema status (i.e. bio-impedance spectroscopy (BIS) score, limb volume and circumference) or the severity of the symptoms was observed between pre-exercise and immediately-post, 24 h-post or 72 h-post exercise. No differences in the response to the high- vs. low-intensity exercise were observed.

Regarding self-reported instructions for lymphedema prevention pre and post self-care educational program implementation, the results illustrated that most of study subjects had poor practice pre implementation of educational program and showed good practice regarding self-care post implementation of the educational program.

This finding is consistent with **Temura & Kapucub, (2019**) who's illustrated at the end of the six-month follow-up that the patients in the intervention group did not develop lymphedema, while more than half of the patients in the control group developed lymphedema during the third month (61.2%) after instructing their study subjects about the importance of maintaining a proper weight, exercise, skin care, and simple lymphatic drainage massage, and importance of follow-up care to prevent BCRL.

Also, this finding in agreement with **Todd et al., (2008)** who found that 10% of his study subjects in the intervention group developed lymphedema while 20% of those in the control group developed it in a 1 year follow up after the Self-Management of

Lymphedema Program implementation (SMLP).

This finding not supported with what was reported by **Meric et al., (2002)** who found in study titled "Long-term complications associated with breast-conservation surgery and radiotherapy" conducted at The University of Texas M. D. Anderson Cancer Center between January 1990 and December 1992 that lymphedema developed in the first month at the earliest and in the109th month at the latest, while it was observed in the 17th month on average after instructing patient for lymphedema prevention.

Regarding incidence of lymphedema, the current study showed that most of study subjects complain of stage 0 of lymphedema before mastectomy in addition to one quarter of them complain of stage 1 of lymphedema immediately after mastectomy. Meanwhile, there was highly statistically significant difference between lymphedema assessment pre and at frequent intervals after mastectomy and the patients' lymphedema were decreased (improved) significantly post implementation of self-care educational program.

This finding was in the same line with **Temura & Kapucub, (2019**) who illustrated that at the end of the six-month follow-up that the patients in the intervention group did not develop lymphedema, while more than half of the patients in the control group developed lymphedema during the third month (61.2%). Also, consistent with **Todd et al., (2008)** who found that by the end of 6 months follow up after implementation of educational strategies in interventional group didn't develop lymphedema.

Concerning arm girth measurement of upper extremities, the present study showed that there were highly statistically significant differences between studied patients' arm girth pre and post implementation of self-care educational program at frequent intervals follow up for 6 month post mastectomy.

This finding supported with **Iyigun et al., (2016**) who illustrated that the physical examination and measurement of arm circumference demonstrated no difference between the two extremities, and thus revealed that the presence of subclinical lymphedema. In addition to, showed that with using the preventive measures, exercises, and treatment may decrease the rate of clinical lymphedema in patients who are diagnosed as having subclinical lymphedema before and after mastectomy.

This finding was congruent with **Temura & Kapucub, (2019**) who illustrated that at the end of the study, while lymphedema development was not observed in the intervention group, 61.2% of the control patients developed lymphedema (The presence of lymphedema was confirmed at 2-cm with a minimum difference in two arms). The difference between the intervention and control groups for the development of lymphedema was found to be statistically significant ($\chi 2=25,943$; $p=0,000$).

As regarding to upper extremity functional index assessment of subjects' lymphedema pre and post implementation of self-care educational the program, the current finding showed that, there were highly statistically significant differences between total score of Upper Extremity Functional Index assessment of lymphedema among studied subjects pre and post implementation of self- care educational program that assessed at frequent intervals before mastectomy and immediately after mastectomy, and at follow-up of program in 2 weeks, 3 months, 6 months which indicates marked decrease in lymphedema.

This finding agreed with Baran, (2016) who indicated in study titled "The effectiveness of lymphedema self-management in the

prevention of breast cancer-related lymphedema and quality of life: A randomized controlled trial" conducted at Hacettepe University hospital, Ankara that used The DASH questionnaire to evaluate the disability, activity limitations, leisure time activities of subjects during the first, third, and sixth months in both the pre-operative and post-operative periods, that illustrated a decline in the DASH scores among the subjects in the intervention group. This decline in the DASH scores is an effect of the exercise program used and instructions given. The findings support the hypotheses that SMLP can be effective at the prevention of BCRL, and it can also be effective at improving the quality of life of subjects.

Conclusion:

There was a marked improvement in studied subjects' total knowledge, learned exercises and self-reported instructions post implementation of educational program with highly statistically significant difference between pre and post implementation of the self-care educational program. As well as there were highly statistically significant difference between lymphedema assessment, arm girth measurement, and Upper Extremity Functional Index (UEFI) assessment of patients' pre and at frequent intervals follow-up of program in 2 weeks, 3 months, 6 months which indicates marked decrease in lymphedema incidence after mastectomy.

Recommendations:

Recommendations for patient:

- Developing a simplified and comprehensive booklet or brochure including basic information regarding breast cancer, and possible complications from treatment modalities used as lymphedema and early interventions and precautionary measures to prevent it.
- Patient should be encouraged for contacting health care team regarding treatment follow up and possible complications from it.

Recommendations for health care team:

- Continuous assessment of the patient to identify who is higher risk for lymphedema before mastectomy to start preventive measures and patient education before operations as well as patient will be prepared physically and psychologically.
- Providing continuous training courses for health care team about new guidelines, techniques and treatment modalities used to prevent lymphedema.
- As well as, there is a need for an ongoing planned training courses regard encouraging nurses to be a lymphedema specialist able to teach patient different exercises safely and give instructions to prevent breast cancer related lymphedema.

References:

American society of clinical oncology, (2020). American Society of Clinical Oncology (ASCO) Annual Meeting Schedule of DCTD Presentations. Accessed on June 30, 2020 at 5:00 pm https://dctd.cancer.gov/NewsEvents/asco2020.htm

Aoishi, Y., Oura, S., Nishiguchi, H., Hirai, Y., Miyasaka, M., Kawaji, M., Shima, A., & Nishimura, Y., (2020). Risk factors for breast cancer-related lymphedema: correlation with docetaxel administration. Breast cancer (Tokyo, Japan). 27(5). 929–937. https://doi.org/10.1007/s12282-020-01088-x

Baran, E., (2016). The effectiveness of lymphedema self-management in the prevention of breast cancer-related lymphedema and quality of life: A randomized controlled trial. Hacettepe

University. Ankara European. Journal of Oncology Nursing.

Brown, G., Weber, D., & De Bie, K. (2014). Assessing the value of public lands using public participation GIS (PPGIS) and social landscape metrics. Applied geography. 53. 77-89.

Cansız G., Arıkan A., Dönmez-Kapucu S., & Borman P., (2022). The effect of a self-management lymphedema education program on lymphedema, lymphedema-related symptoms, patient compliance. daily living activities and patient activation in patients with breast cancer-related lymphedema: A quasi-experimental study. Elsevier Ltd https://doi.org/10.1016/j.ejon.2021.102081

Chung S. Y., Chang J. S., Shin K. H., Kim J. H., Park W., Kim H., & Kim Y. B., (2021). Impact of radiation dose on complications among women with breast cancer who underwent breast reconstruction and post-mastectomy radiotherapy: A multi-institutional validation study. The Breast. 56. 7-13

Cormie P., Galvao D., Spry N., & Newton R. (2011). The impact of high vs. low intensity resistance exercise on lymphoedema status and severity of symptoms. Journal of Science and Medicine in Sport. 14. e12-e13.

Deveci, Z., Karayurt, Ö., Bilik, O., & Eyigör, S. (2020). Development of the Breast Cancer Related Lymphedema Self-Care Scale. Clinical nursing research. 1054773820947980. Advance online publication. https://doi.org/10.1177/1054773820947980

Dollar W., (2013). [Lymphedema: anatomy, physiology and pathophysiology of lymphedema, definition and classification of lymphedema and lymphatic vascular malformations]. Wien Med Wochenschr. 163(7-8):155-61.

Douglass J., Hayley E., Martindale S., & Louise A. Kelly-Hope (2019). An Enhanced Self-Care Protocol for People Affected by Moderate to Severe Lymphedema, Centre for Neglected Tropical Diseases. Department of Tropical Disease Biology. Liverpool School of Tropical Medicine. Liverpool L3 5QA, UK

Flores A. M., Nelson J., Sowles L., Stephenson R. G., Robinson K., Cheville A., & Blot W. J. (2020). Lymphedema signs, symptoms, and diagnosis in women who are in minority and low-income groups and have survived breast cancer. Physical therapy. 100(3). 487-499.

Fu, M. R., (2014). Breast cancer-related lymphedema: Symptoms, diagnosis, risk reduction, and management. World Journal of Clinical Oncology. 5 (3). 241. doi:10.5306 /wjco.v5.i3.241.

Fu, M. R., Axelrod, D., Guth, A. A., Wang, Y., Scagliola, J., Hiotis, K., & El-Shammaa, N., (2016). Usability and feasibility of health IT interventions to enhance Self-Care for Lymphedema Symptom Management in breast cancer survivors. Internet interventions, 5, 56-64.

Gillespie, T. C., Sayegh, H. E., Brunelle, C. L., Daniell, K. M., & Taghian, A. G., (2018). Breast cancer-related lymphedema: risk factors. precautionary measures, and treatments. Gland Surg. (4):379-403. doi: 10.21037/gs.2017.11.04. PMID: 30175055; PMCID: PMC6107585.

Iyigun Z. E., Duymaz T., Ilgun A. S., Alco G., Ordu C., Sarsenov D., Aydin A. E., Celebi F. E., Izci F., Eralp Y., & Ozmen V., (2016). Preoperative Lymphedema-Related Risk Factors in Early-Stage Breast Cancer, Lymphatic Research and Biology. Mary Ann Liebert, Inc.

Kim, S., Han, J., Lee, M. Y., & Jang, M. K., (2020). The experience of cancer-related fatigue, exercise and exercise adherence among women breast cancer survivors: Insights from focus group interviews. Journal

of clinical nursing. 29(5-6). 758–769. https://doi.org/10. 1111/jocn.15114

Kilbreath S. L., Refshauge K. M., Beith J. M., Ward L. C. , Ung O. A., Dylke E. S., French J. R., Yee J., Koelmeyer L. , & Gaitatzis K.,(2016). Risk factors for lymphedema in women with breast cancer: A large prospective cohort. Elsevier Ltd doi: 10.1016/j. breast

Lee, B. B., Antignani, P. L., Baroncelli, T. A., Boccardo, F. M., Brorson, H., Campisi, C., & Yamamoto, T., (2015). IUA-ISVI consensus for diagnosis guideline of chronic lymphedema of the limbs. Int Angiol. 34(4). 311-32.

Meric, F., Buchholz, T.A., Mirza, N.Q., Vlastos, G., Ames, F.C., Ross, M.I., & Kuerer, H.M., (2002). Long-term complications associated with breast-conservation surgery and radiotherapy. Ann. Surg. Oncol. 9 (6). 543–549.

Norman, S. A., Localio, A. R., Kallan, M. J., Weber, A. L., Torpey, H. A. S., Potashnik, S. L. & Solin, L. J. (2010). Risk factors for lymphedema after breast cancer treatment. Cancer Epidemiology and Prevention Biomarkers.19(11). 2734-2746.

Ostby, P. L., Armer J. M., Dale P. S., Van-Loo M. J., Wilbanks C. L., & Stewart B. R., (2014). Surveillance recommendations in reducing risk of and optimally managing breast cancer-related lymphedema. J Pers Med. 4(3).424-47.

Sherman K. A., Miller S. M., Roussi, P., & Taylor A., (2015). Factors predicting adherence to risk management behaviors of women at increased risk for developing lymphedema. Support Care Cancer 23. 61–69 https://doi.org/10.1007/s00520-014-2321-1

Sherma, K. A., & Koelmeyer L., (2011). The role of information sources and objective risk status on lymphedema risk-minimization behaviors in women recently diagnosed with breast cancer. In Oncology Nursing Forum. 38(1).

Simonavice, E., Kim, J.-S., & Panton, L. (2016). Effects of resistance exercise in women with or at risk for breast cancer-related lymphedema. Supportive Care in Cancer. 25(1). 9–15. Doi: 10.1007/s00520-016-3374-0.

Smile, T. D., Tendulkar, R., Schwarz, G., Arthur, D., Grobmyer, S., Valente, S., Vicini, F., & Shah, C., (2018). A Review of Treatment for Breast Cancer-Related Lymphedema: Paradigms for Clinical Practice. American journal of clinical oncology. 41(2).178–190. https://doi.org/10.1097/COC.0000000000000355

Temura K., & Kapucub S., (2019). The effectiveness of lymphedema self-management in the prevention of breast cancer-related lymphedema and quality of life: A randomized controlled trial. European Journal of Oncology Nursing. Elsevier.

Todd N. J., Jones S. H., Hart A., & Lobban F. A. (2008). A web-based self-management intervention for bipolar disorder 'living with bipolar': a feasibility randomised controlled trial. Journal of affective disorders. 169. 21-29.

Virani, S., Baiocchi, G., Bowtell, D., Cabasag, C. J., Cho, K. R., Fortner, R. T., Fujiwara, K., Kim, J. W., Köbel, M., Kurtz, J. E., Levine, D. A., Menon, U., Norquist, B. M., Pharoah, P., Sood, A. K., Tworoger, S. T., Wentzensen, N., Chanock, S. J., Brennan, P., & Trabert, B., (2021). Joint IARC/NCI International Cancer Seminar Series Report: expert consensus on future directions for ovarian carcinoma research. Carcinogenesis. 42(6). 785–793. https://doi.org/10.1093/ carcin/ bgab043

تأثير البرنامج التمريضي على معلومات وأليات الرعاية الذاتية للمرضي فيما يتعلق بالوقاية من الإستسقاء الليمفاوي بعد استئصال الثدي

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الاستسقاء الليمفاوي بعد استئصال الثدي يعتبر من أكثر المضاعفات الخطيرة شيوعًا الناتجة عن علاجات سرطان الثدي المستخدمة و التي تزيد من حدوث الاستسقاء الليمفاوي بعد استئصال الثدي. لذا هدفت الدراسة الي تقيم معلومات وممارسات المرضي المتعلقة باليات الرعاية الذاتية للوقاية من الإستسقاء الليمفاوي بين الإناث بعد استئصال الثدي. تم استخدام تصميم شبه تجريبي بإستخدام نهج الاختبار القبلي والبعدي لتحقيق هدف الدراسة. وقد أجريت هذه الدراسة في قسم الجراحة العامة وقسم الاورام التابع لمستشفي جامعة بنها - محافظة القليوبية - مصر. حيث تضمنت عينة هادفة من 60 مريضة بالغة بعد إستصال الثدي للمشاركة بالدراسة الحالية. وأظهرت الدراسة ان ثلث المرضى يعانون من الاستسقاء الليمفاوي الحاد مباشرة بعد استئصال الثدي ، وكان هناك ارتباط إيجابي بين المتغيرات الكلية للمرضى وتعليماتهم المبلغ عنها ذاتيًا للوقاية من الاستسقاء الليمفاوي قبل تنفيذ البرنامج وبعده وقبل وبعد استئصال الثدي أيضًا في متابعة البرنامج التمريضي في أسبوعين و 3 أشهر و 6 أشهر. وقد خلصت الدراسة الي ان معظم مرضي الدراسة لم يصابوا بالاستسقاء الليمفاوي بعد استئصال الثدي من خلال متابعتهم بعد 3 اشهر و 6 اشهر من تنفيذ البرنامج التعليمي للرعاية الذاتية. وعلاوة علي ذلك, لوحظ تحسن ذو دلالة إحصائية في اجمالي معلومات المرضي والتمارين المتعلمة و أليات الرعاية الذاتية للمرضي الخاضعين للدراسة, بعد تنفيذ البرنامج التعليمي مع وجود فرق كبير إحصائيا قبل وبعد تنفيذ البرنامج التعليمي للرعاية الذاتية. كما اوصت الدراسة بتكرار الدراسة علي عينة كبيرة من المرضي في أماكن مختلفة في مصر لتعميم النتائج.