Effect of Nutritional Teaching Program on Clinical Outcomes for Breast Cancer Patients Undergoing Chemotherapy

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Abstract

Breast cancer and its treatment especially chemotherapy-related symptoms may greatly affect the nutritional status of the patient so good nutrition are important especially during treatment , it can lead to better outcomes for breast cancer treatment. **Aim of the study**: to determine the effect of nutritional teaching program on clinical outcomes for breast cancer patients undergoing chemotherapy. **Research design**: Quasi-Experimental design was utilized in this study, **Subjects and setting:** A convenience sample of 60 patients who had primary breast cancer at Clinical Oncology and Nuclear Medicine Department at Tanta University Hospital in the specialized chemotherapeutic wards and in outpatient's clinic. ; The sample was divided randomly and equally into two groups; control group was received routine hospital nutrition and study group who received nutritional teaching program and routine hospital. **Tools of data collection:** two tools were used, **tool I:** structured interview schedule. **Tool II:** "Nutritional status assessment tool consisted of four parts: **Part (1)** physical examination, physiological parameter, signs and symptoms of nutritional deficiency .**Part (2):** Dietary intake. **Part (3)** Anthropometric measurements observational checklist .**Part (4):** laboratory data. **Results** indicated that there were highly statistically significant differences between study and control groups throughout the study period regarding mean knowledge P= (0.012, 0.008 and 0.019) respectively, regarding pale skin, fatigue ,weakness, alopecia, constipation and vertigo in the third month after chemotherapy sessions since p=(0.002, 0.010, 0.044, 0.020, 0.020 and 0.010) respectively. **Conclusion:** It can be concluded that early nutritional teaching program before beginning chemotherapy session and during chemotherapy periods is very effective on reducing chemotherapy side effects and improving health status. **Recommendation**   nutritional support, advice and guidelines by dietician and nurse of the nutritional regimen should be undertaken for patients undergoing chemotherapy.

Key wards: Nutrition, Chemotherapy, Anthropometric measurement, physiological parameter

Introduction

Cancer can start in any organ or tissue of the body when abnormal cells grow uncontrollably. It may be spread to other organs which metastasizing and it is the major cause of death from cancer. [1]. Cancer is the second leading cause of death globally, accounting for an estimated (19.3) million new cancer cases (18.1) million excluding non-melanoma skin cancer and almost (10.0) million cancer deaths (9.9) million excluding non-melanoma skin cancer) occurred in 2020 [2,3]. Breast cancer (BC) is an important global public health problem due to its high incidence and mortality. In 2020, an estimated 276,480 new cases of invasive breast cancer will be diagnosed in women in the U.S. as well as 48,530 new cases of non-invasive breast cancer. 64% of breast cancer cases are diagnosed at a localized stage, for which the 5-year survival is 99%. [3]

Astatistical record of Tanta Clinical Oncology and Nuclear Medicine department indicated that the number of patients admitted with breast cancer at 2020 is 510[4]. In Egypt, breast cancer is the most common cancer among women. It represents 16.4 % of total cancer cases (32.4 % in woman and 2.2 % in men) adjusted rate of 49.6 per 100 000 population .In its early treatable stage ,cancer breast has a 97% probability of surviving 5 years2020 [5].

Breast cancer begins in the breast tissue that is made up of glands for milk production, called lobules, and the ducts that connect the lobules to the nipples. The remainder of the breast is made up of fatty, connective, and lymphatic tissues [6].

Breast cancer treatment options based on type of breast cancer, its stage and grade, size, and whether the cancer cells are sensitive to hormones and most women undergoing surgery also receive additional treatment before or after surgery, such as chemotherapy, hormone therapy or radiation therapy[7].

Chemotherapy is a method of treatment option for most types of breast cancer. The decision to use chemotherapy is based on the tumor stage and certain tumor characteristics (such as hormone receptor status), as well as the patient's age, overall health and personal preferences [8]. Chemotherapy for breast cancer frequently is used in addition to other treatments, such as surgery, radiation or hormone therapy. Receiving chemotherapy for breast cancer may increase the chance of a cure, decrease the risk of the cancer recurrence, alleviate symptoms from the cancer or help people with cancer live longer with a better quality of life.[9]

Chemotherapy after breast surgery is divided into adjuvant and neoadjuvant chemotherapy. Adjuvant chemotherapy is used for early breast cancer and helps to lower the risk of breast cancer recurrence by getting rid of cancer cells that might still be present in the body but neoadjuvant chemotherapy may shrink the tumor enough that a lumpectomy becomes an option. In women with locally advanced breast cancer, neoadjuvant chemotherapy can reduce the size of the tumor in the breast and/or in the lymph nodes, and make it easier to remove the cancer surgically [10].

Cancer's patient develop clinically malnutrition up to 85%, which negatively affects patients' response to therapy, increases the incidence of treatment-related side effects and can decrease survival[11]. Cancer and cancer therapy affect nutritional status through alterations on the metabolic system and reduction in food intake.

All of the treatments for cancer such as systemic chemotherapy, radiation and surgery result in damage to normal tissues, and at the same time produce intense side effects such as diarrhea, oral mucositis, nausea, and vomiting that limit eating. Malnutrition and severe weight loss become evident as the disease progress. [12]

Chemotherapy treatment especially is associated with several side effects like nausea, vomiting, oral mucositis, xerostomia, diarrhea ,constipation, and food aversion which play an important role in decreased food intake, nutrient loss, energy expenditure alterations and weight loss, particularly lean body mass as well as distortions to their sense of taste or smell. Cancer patients also report early satiety and food aversions as results of treatment .These conditions predispose patients towards malnutrition, especially when there are frequent and prolonged periods of chemotherapy treatment. [12]

Nurses are in a prime position to encourage and influence women to be aware about breast cancer and to be involved in their own health. Nurses can recognize the needs of patients and be effective in controlling disease complications as well as enhancing the quality of life of such group of patients.

The nurse as educator must continually assess the patient's understanding, which is achieved through face-to-face interactions, answering of the patient's questions and observation decision-making process [13]

Nurses play an important role in the early detection as well as the identification of patients at risk of developing malnutrition. Nutritional screening should be carried out by nurses when patients are admitted to hospital, and throughout their hospital stay, in order to effectively plan their nutritional care and identify any changes occurred in patient's.[14]

Early nutritional intervention is cost effective, as it reduces complication rates and length of hospital stay also, it can promote recovery and improve prognosis. The development and use of screening and assessment tools is essential for effective nutritional intervention and management of patients with cancer [12]. Dietary interventions, like dietary counseling, flavor enhancement, oral supplementation, ortube feeding, are found to reduce weight loss and improve health status. The dietary approach might be helping to raise cancer treatment to a new level of success [15].

Significance of the study

Breast Cancer-related malnutrition frequently develops, with prevalence ranging from 30% to 90% depending on tumor site, stage of disease and treatment. Malnutrition can be exacerbated by the side-effects of chemotherapy and impairs tolerance to it [16-17]. So this study aimed to measure the effect of nutritional teaching program on breast cancer patient's clinical outcomes undergoing chemotherapy

The aim of the study is to

Determine the effect of nutritional teaching program on clinical outcomes for breast cancer patients undergoing chemotherapy.

Research hypotheses

Breast cancer patients post implementing of the nutritional teaching program ,the breast cancer patients exhibited improve in there nutritional parameters in the study group attending nutritional teaching program and less chemotherapy nutritional side effect than control group.

Materials and method

Research design

A quasi-experimental research design was used to conduct this study.

Setting

This study was conducted at Clinical Oncology and Nuclear Medicine Department at Tanta University Hospital in the specialized chemotherapeutic wards and in outpatient's clinic. The hospital consisted of 5 wards, each ward contain 6 beds and total number of beds are 30 beds for male and female Patients.

Subjects

A convenience sampling of (60) breast cancer patients who had primary breast cancer and scheduled for chemotherapy were selected before administered chemotherapy and divided randomly in to two equal groups, 30 patients in each group. The sample size calculation by power analysis based on patients admission in hospital and expected improvement of patients outcomes among studied groups at 95% confidence power of the study.

Group 1: Control group, it was consisted of (30) patients who received the routine hospital care and routine diets.

Group 2: Study group;, it was consisted of (30) patients who received the nutritional teaching interventions beside hospital routine care .

Equation for determining sample size at 95% confident power of the study

$$n = \frac{N \times P(1-P)}{(N-1 \times (d^2/z^2) + P(1-P)}$$

n= sample size

N= total society size

D= error percentage (0, 05)

Z= the correspond standard class of significance 95% (1,69)

P= percentage of availability of the objectivity = (0, 1)

The following criteria were used for selecting sample

Age range from 21 to 60 years old, both sexes ,patients with stage I and II breast cancer .

Undergoing adjuvant chemotherapy , and communicating verbally and non-verbally.

- **Tools of data collection**

Two tools were used in this study.

Tool (I) structured interview schedule. This tool was developed by the researcher after reviewing of the related literatures [18,19].

It was consisted of two parts:

Part (1) Socio-demographic data" which includes: patient code , age, marital status, educational level, occupation and residence.

Part (2) Health history assessment sheet that was include: date of admission, past medical history and present medical history and stage of breast cancer, treatment.

Tool II: Nutritional status assessment tool

This tool was adapted by the researcher depends on the study of related literatures [20, 21]. It was consisted of four parts:

Part (1) physical examination: include assessment from head to toes, physiological parameter, presence of edema, wasting of muscle of hand, signs and symptoms of nutritional deficiency as hair loss, burning sensation in the feet, constipation, bone pain by Scoring system, the question answered with yes took (1) if the problem is present and question answered with no took (0) if the problem is not present .

Part (2): Dietary intake assessment include: (current intake, previous intake, 24-hour dietary recall, patients like and dislike [22].

Part (3) Anthropometric measurements (Height, Weight, body mass index (BMI) is calculated using the following formula: weight (kg)/height^2 (m^2).Triceps skin fold thickness, Mid-arm circumference

BMI	Classification
18.5 to 24.9	Normal weight
25 to 29.9	Overweight
30+	Obesity
40+	Extreme obesity

Part (4): laboratory data (complete blood picture, Hemoglobin and Serum Albumin and Total lymphocyte count)

Method

The study was accomplished through the following steps Obtaining approval

-An official permission to conduct the study was obtained from the responsible authorities.

Ethical and legal considerations

-An informed consent was obtained from all study subjects after providing appropriate explanation about the aim of the study.

-Consent of ethical committee was obtained.

-Each participant was informed that he has the right to withdraw from the study any time he wanted.

-Nature of the study did not cause any harm or pain for the entire subjects.

-Confidentiality and privacy were put into consideration regarding the collected data .A code number was used instead of name .

Methods of data collection

-The tools of the study were developed after review of related literature.([23,24,25,26].

-The study tools were presented to a jury of (5) experts in the area of medical surgical nursing professors and medicine professors to check content validity.

Pilot study

-A pilot study was conducted on (6) patients to test the feasibility and applicability of the tools and to determine any obstacles that may be encountered with the researcher during the period of data collection; accordingly, needed modifications were done.

-The pilot sample was included in the main study sample because no modifications were done on the study tools.

Reliability was applied on tool II was translated into Arabic and content validity and applicability will be done.

Duration of data collection: Data of the study were collected over a period of 6 months from (28 august 2020 to 2 march 2021)

Nutritional teaching program was conducted through four main phases which are (assessment, planning, implementation and evaluation)

a- Assessment Phase

Data was collected from patients and from their current medical records as a baseline measures for their socio demographic data health history and nutritional status by using study tools I and II.) for both control and study groups before implementing the intervention. [26].

Assessment includes treatment of breast cancer especially chemotherapy, side effects of chemotherapy and its effect on nutrition status. Assessment nutrition status for patient thought tool II via complete physical examination assessment from head to toes ,physiological parameters using burer scale to determine rate of all body fats and water retention in the body and using caliper to measure skin fold thickness in arms [27] , Assessment of signs and symptoms of nutritional deficiency as hair loss, burning sensation in the feet, constipation and determine patients knowledge about nutrition deficiency, assessment for bone pain though pain scale. [28]

Assessment dietary intake via the last 24 hours either current intake, previous intake and patients like and dislike and changes occurred in taste due to chemotherapy.

b- Planning phase

A designed Nutritional teaching program was developed by the researchers after reviewing of the related literature. Objectives of the study were determined based on the needs of the study subjects The planning phase included; preparing the environment, preparing attractive booklet for improve knowledge about chemotherapy and nutrition for breast cancer patients. The intervention was carried out for 3 sessions (over three months). Preparing the environment; was performed to maintain privacy for breast cancer patients during physical examination, Good ventilation also was maintained throughout the intervention as much as possible. The goal of nutritional teaching programs to improve patient nutritional status, clinical outcomes. The program will be translated into Arabic languish and introduce in attractive booklet and using lecture and group discussion.[29] Each session schedule took about 20-30 minutes.

Implementation

Phase of implementing nutritional teaching program for breast cancer patients undergoing chemotherapy. Adapted by the researcher based on **Heal Well a Cancer Nutrition Guideline** [30] the nutritional program was presented to the patients by the researcher. Study subjects were divided into 5 subgroups, each subgroup contained 6 patients and attained three sessions. The time for every session was about 20-30 minutes.

First session

This session focused on

Introduction about breast cancer , breast cancer treatments, causes, risk factors and manifestations of breast cancer, maintain a healthy weight, eating healthy foods that supply body with calories and nutrients for energy, repair, recovery, and healing.

Second session: treatment side effects that can impact nutritional well-being

This session focused on breast cancer treatment (chemotherapy) side effect as :changes in appetite and unwanted weight loss, nausea and vomiting, fatigue , bowel changes: diarrhea and constipation, changes in taste and smell, changes in taste and smell, unwanted weight gain, sore mouth or throat and low white blood cell counts and infection

Third session: Food safety tips

It focused on food safety tips especially important for people undergoing and recovering from cancer treatment. The patient should consuming cold foods and eating small meals frequently, avoiding spicy, very sweet, greasy, or fried foods, consuming liquids with ice chips or frozen juice chips, among others). The patient should clean teeth or dentures with a soft brush after eating and floss gently, use an alcohol-free mouthwash , choose soft or liquid foods such as soups, stews, smoothies and desserts, soothe your mouth and gums with ice cubes and sugar-free ice lollies   Fatigue is the most common side effect from chemotherapy for breast cancer patients. Eating regularly and being as physically active as patient are able may help to relieve fatigue and enhance mood, temporarily rely on ready-to-eat foods like frozen dinners, fruits, and vegetables. Patients should drink plenty of fluids to prevent dehydration that make fatigue worse.

D- Evaluation Phase

Aimed to reassess patients after implementation   of the nutritional program, it was done by the following schedule; immediate and after one and three months after implementing nutritional program by using tools (II) for evaluation .

The control group was received a routine hospital care and was assessed by the researcher by the following schedule; immediate and after one and three month after implementing their hospital care by using tools (II) for evaluation.

The control group received a routine hospital care that high carbohydrate, low in protein , fibers , just 3 meals and, regarding nutritional care before ,during and through three month of chemotherapy begging was assessed by the researcher by the same schedule of the study groups and by using tools (I, II) for evaluation

Limitations of the study

-The field of work was overcrowded with other patients and visitors, so this caused researcher's exhaustion.

-There was lake of privacy for women during chemotherapy receiving, so was more difficult for the researcher during taking patient history.

-There some problems during anthropometric measurement.

Statistical analysis

Statistical presentation and analysis of the present study was conducted, using the mean, standard deviation, **unpaired student t-test** was used to compare between two groups in quantitative data, **chi-square test** was used to compare between groups in qualitative, **ANOVA test** was used for comparison among different times in the same group in quantitative data, **linear correlation coefficient** was used for detection of correlation between two quantitative variables in one group. By (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.)...[31]

Significant level

>0.05 Non significant   <0.05* significant <0.001* High significant

Results

Table (1): Percentage distribution of the study samples according to socio-demographic data

This table reveals that near half (46.7%) of the study group and more half (56.7%) of the control group were in age group of 30-<40 year. As for the marital status, more than half of the total samples were married. In relation to number of children, near half of the total samples have 1-3 children. Regarding to place of residence, more than half of the total samples live in rural areas. In relation to educational level, near half of the total samples were have moderate education. Finally this table shows there was no a statistical significant difference found in both groups regarding their socio demographic data.

Table (2): Percentage distribution of the study samples in relation to clinical data

This table illustrates clinical data of the study samples. It shows that most (76.7%) of the study group and (70%) of the control group had a past history of anemia and also this results reveals that more than quarter of the total samples had a past history of hypertension. Regarding to the occurrence of the breast cancer in the relatives this table demonstrates that (30%) and (16.7%) 0f the study and control group have a mothers suffering from breast cancer respectively. In relation to stage of breast cancer this results found that near half and more than half of the total samples have first degree and second degree breast cancer respectively in both study and control group . No statistical significant differences were found among the study groups regarding their clinical data.

Table (3): Malnutrition manifestation of the study samples throughout the period of implementing Nutritional teaching program.

Regarding to gastrointestinal manifestation, this results shows that (40%) of the study group have no gastrointestinal manifestation before first session of chemotherapy but the percentage decreased to (26.7 %) at third months of follow up on other hand half of the control group have no gastrointestinal manifestation before first session of chemotherapy but the percentage decreased to (16.7%) at third months of follow up third (10.0%) at third months of follow up. Also these results found that about third of the study group suffering from loss of appetite before first session of chemotherapy but the percentage decreased to minority (13.3%) at third months of follow up compared to third (20.0%) of the control group suffering from loss of appetite before first session of chemotherapy and still with the same percentage at third months of chemotherapy sessions. Lastly this results reveal that there was statistical significant differences were found among the study samples regarding loss of appetite, nausea and vomiting in the third month after chemotherapy sessions since p=(0.028, 0.023and 0.010) respectively.

Figure (1): Relation between signs and symptoms of mal nutrition of the study samples throughout the period of implementing nutritional teaching program.

This figure shows that Relation between signs and symptoms of mal nutrition of the study samples throughout the period of implementing nutritional teaching program**.** there was statistical significant differences were found among the study samples regarding pale skin, fatigue ,weakness, alopecia, constipation and vertigo in the third month after chemotherapy sessions since p=(0.002, 0.010, 0.044, 0.020, 0.020 and 0.010) respectively.

Figure (2): Gastrointestinal manifestation of the study group at three months post implementing nutritional teaching program in relation to signs of malnutrition

This figure shows the relation between gastrointestinal manifestation and signs of malnutrition of the study group at three months post chemotherapy sessions in which that the highest mean ± SD of signs of malnutrition were in patients suffering from nausea and loss of appetite since mean=(4±0.0 and 3.33±2.31) respectively

Figure (3): Body mass index (BMI) of the study group at three months post chemotherapy sessions in relation to arms swelling

This figure shows the relation between body mass index (BMI) of the study group at three months post chemotherapy sessions in relation to arms swelling, it shows that the highest score (65%) of the study group have arm swelling with extreme obesity and the lowest score (3.8%) have arm swelling with ideal body weight patients.

Figure (4): Correlation between dietary intake and signs of malnutrition of the study group at three months post chemotherapy sessions

Concerning the dietary intake and signs of malnutrition of the study group at three months post chemotherapy sessions, this figure illustrates that there was a significant negative correlation between dietary intake and signs of malnutrition where r = (-0.481) since p-value= (0.007).

Figure (5): Correlation between Signs of malnutrition and total physiological parameter of the study group at three months post chemotherapy sessions

This figure illustrates that there was a statistical positive correlation between signs of malnutrition and total physiological

parameter of the study group at three months post chemotherapy sessions where r (0.506) and p-value= (0.004).

Figure (6): Correlation between dietary intake and total physiological parameter of the study group at three months post chemotherapy sessions
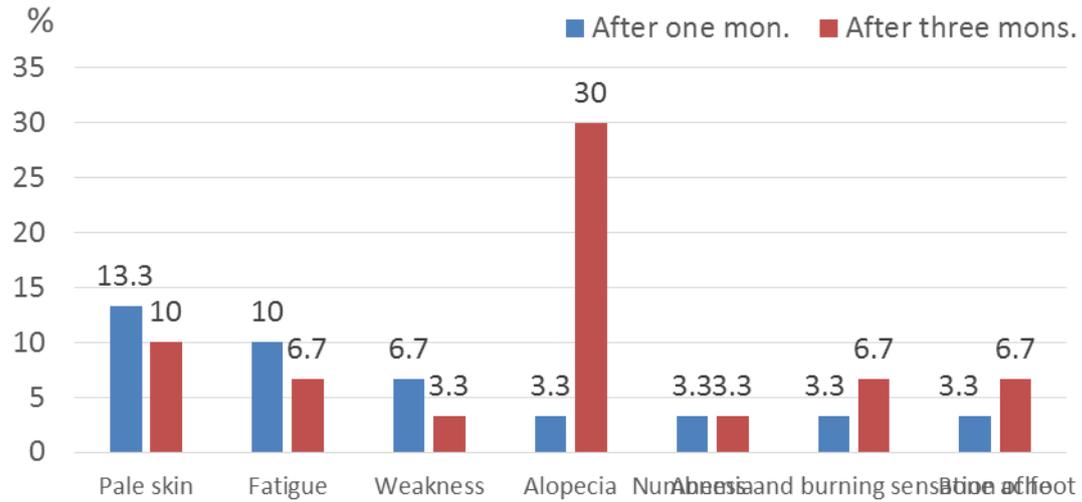
Results

This figure demonstrates that there was a statistical negative correlation between dietary intake and total physiological parameter of the study group at three months post chemotherapy sessions where r (-0.606) and p-value=<0.001.

Table (1): Percentage distribution of the study samples according to socio-demographic data

socio-demographic data	The study samples (N=60)				Chi-square	
	Study (N=30)		Control (N=30)			
	N	%	N	%	X^2	P-value
Age						
21-<30 year	6	20	5	16.7		
30-<40 year	14	46.7	17	56.7		
40-<50 year	6	20	5	16.7	0.615	0.893
50-60 year	4	13.3	3	10		
Mean±SD	33.45±5.32		32.8±4.76			
Marital status						
Single	7	23.3	5	16.7		
Married	17	56.7	18	60	1.171	0.760
Widow	2	6.67	4	13.3		
Divorced	4	13.3	3	10		
Number of children						
None	8	26.7	7	23.3		
(1-3)	12	40	13	43.3	0.285	0.867
(4-6)	3	10	2	6.67		
Place of residence						
Rural	20	66.7	18	60	0.287	0.592
Urban	10	33.3	12	40		
Level of education						
Illiterate	7	23.3	3	10		
Read and write	6	20	5	16.7	2.537	0.469
Moderate education	12	40	14	46.7		
High education	5	16.7	8	26.7		
Occupation						
Work	19	63.3	17	56.7	0.278	0.598
Not work	11	36.7	13	43.3		
Is women menopause? Yes	10	33.3	9	30	0.077	0.781
No	20	66.6	21	70		

Table (2): Percentage distribution of the study samples in relation to clinical data

| Clinical data | The study samples (N=60) | | | | Chi-square | |
| | Study (N=30) | | Control (N=30) | | | |
	N	%	N	%	X^2	P-value
Past history						
Anemia	22	73.3	19	63.3		
Hypertension	6	20	9	30	0.820	0.664
Gout	2	6.7	2	6.7		
Occurrence of breast cancer with relatives						
Not occur	16	53.3	19	63.3		
Mother	9	30	5	16.7		
Sister	3	10	2	6.7	2.600	0.627
Aunt	1	3.3	3	10		
Grand mother	1	3.3	1	3.3		
Stage of breast cancer at surgery						
First stage	12	40	14	46.7		
Second stage	18	60	16	53.3	0.271	0.602

Table (3): Malnutrition manifestation of the study samples throughout the period of implementing Nutritional teaching program.

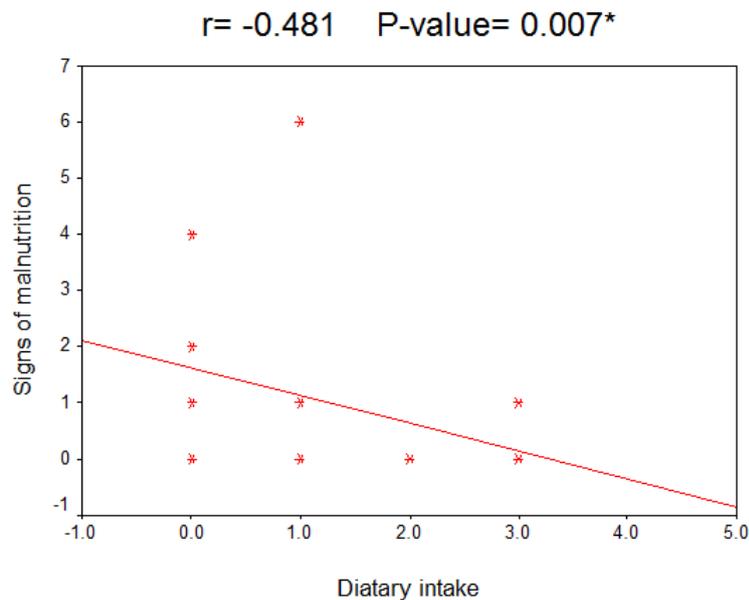| | Study (N=30) | | | | | | Control (N=30) | | | | | | Chi-square | | | | | |
| | Before first session of chemotherapy | | one month after chemotherapy sessions | | 3months after chemotherapy sessions | | Before first session of chemotherapy of routine hospital care | | one month after chemotherapy sessions of routine hospital care | | 3months after chemotherapy sessions of routine hospital care | | Before | | one month | | 3months | |
	N	%	N	%	N	%	N	%	N	%	N	%	X^2	P-value	X^2	P-value	X^2	P-value
Malnutrition manifestation																		
None	12	40.0	10	33.3	8	26.7	15	50.0	5	16.7	3	10.0	0.606	0.436	0.069	0.793	3.270	0.071
Loss of appetite	9	30.0	4	13.3	4	13.3	10	33.3	10	33.7	6	20.0	0.077	0.781	4.356	0.037*	4.812	0.028*
Nausea	5	16.7	6	20.0	5	26.7	2	6.7	8	26.7	7	23.3	1.456	0.228	4.320	0.038*	5.192	0.023*
Vomiting	4	13.3	10	33.3	10	33.3	3	10.0	7	23.3	14	46.7	0.000	1.000	2.963	0.085	6.667	0.010*

Figure (1): Relation between signs and symptoms of mal nutrition of the study samples throughout the period of implementing nutritional teaching program.
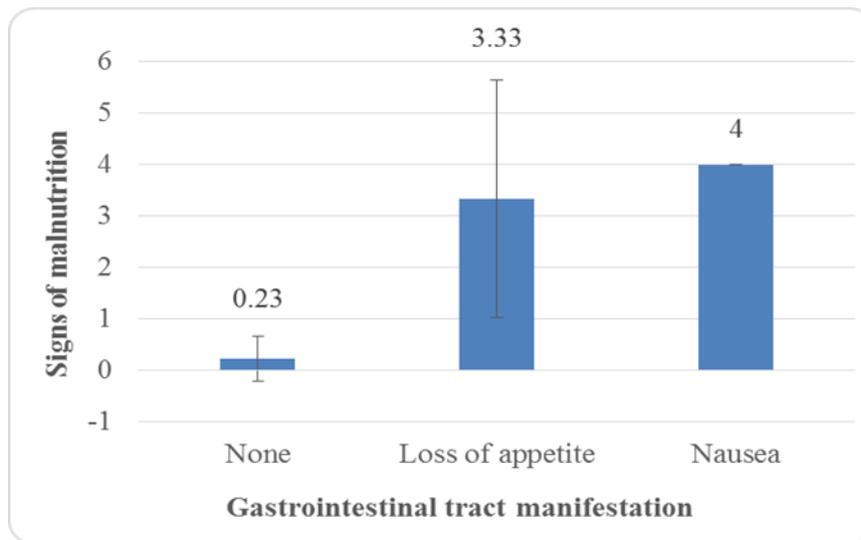

Figure (2): Gastrointestinal manifestation of the study group at three months post implementing nutritional teaching program in relation to signs of malnutrition
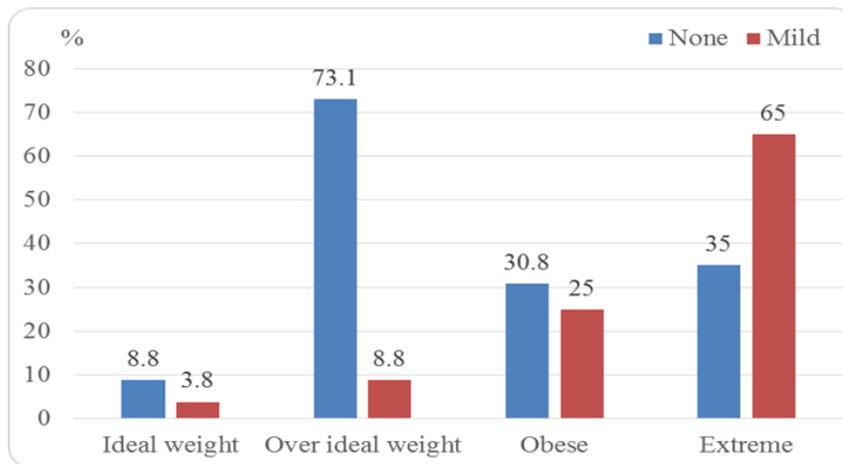
Figure (3): Body mass index (BMI) of the study group at three months post chemotherapy sessions in relation to arms swelling

Figure (4): Correlation between dietary intake and signs of malnutrition of the study group at three months post chemotherapy sessions

r= 0.506   P-value= 0.004*

Figure (5): Correlation between Signs of malnutrition and total physiological parameter of the study group at three months post chemotherapy sessions

r= -0.606   P-value <0.001*
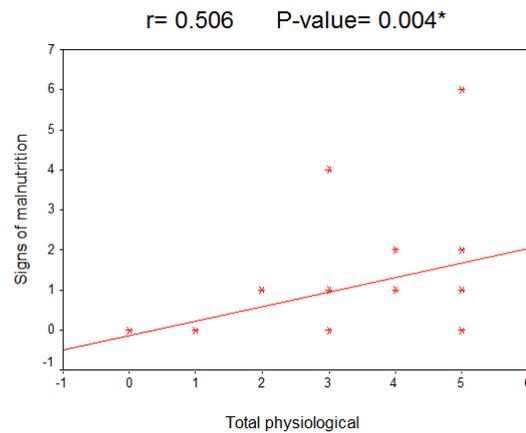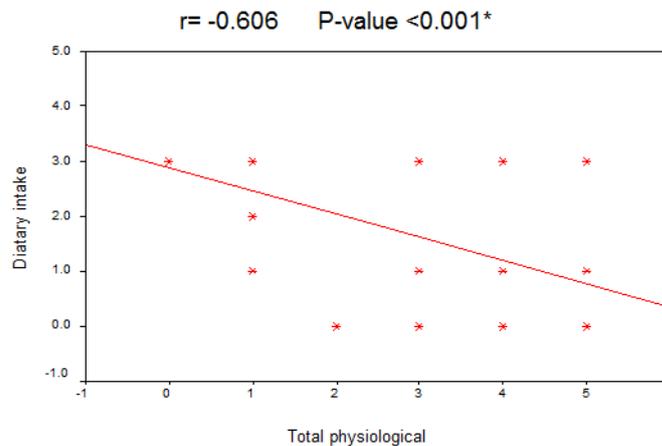
Figure (6): Correlation between dietary intake and total physiological parameter of the study group at three months post chemotherapy sessions

Discussion

Breast cancer is a kind of cancer that develops from breast cell. Breast cancer is the most common type of malignancy among women worldwide **(Manoochehri, 2018)** [(31)]. Mastectomy is a standard treatment option for breast cancer **(Magtanong et al., 2018)**. [(32)]. Breast cancer and its treatment result in physical and psychological problems. So, it is the responsibility of the nurse to identify the breast cancer patient's needs, make an appropriate nursing diagnosis and initiate plans for care, .[(33)] It results in the physical and physiological problems .Chemotherapy is the cancer treatment most likely to weaken the immune system [(34)]

Malnutrition can be exacerbated by the side-effects of anticancer drugs (chemotherapy) such as fatigue, anorexia, [34], and physical inactivity resulting from physical and psychosocial distress, which may lead to further loss of muscle mass. Malnutrition impairs tolerance to anticancer treatments including chemotherapy and is associated with decreased response to treatment, decreased quality of life [35].So this study used to determine the effect of nutritional teaching program on clinical outcomes for breast cancer patients undergoing chemotherapy . **The findings of the present study** revealed

that near half of the study group and more than half of the control group were in age group between 30-<40 year. This finding is justified by longer life expectancy, as well as increases in breast cancer incidence of women arrives to 40 years due to changes in reproductive patterns, menopausal hormone use, the rising prevalence of obesity and genetic damage (mutations) in the body at this age[34-45].**This finding was in agreement with Ferlay (2018),**who mentioned that the majority of studied samples ranged in age between (15–39)years, also this result was consistent with **Coa (2015)[34,35]** This finding was contradicted with **Jarvandi(2016)[36]**, who mentioned in his study that two thirds of all newly diagnosed female breast cancer patients are in the age 55 years and older and this can be attributed to the postmenopausal period of life.

As regards to marital status and occupation, the present study showed that more than half of the total sample was married. **This result was similar to Hoffmann (2018) [37],** who mentioned that, the majority of the women in both groups were married. **This finding was in disagreement with Soliman (2018)[38] ,**who found that the majority of the study group was widowed and near half of the study group had administrative work, also this finding was contradicted with **Hayes (2012),** who illustrated that unmarried and nulliparous had an increased risk for developing breast cancer due to prolonged or repeated exposure to estrogen hormones[39].

In relation to number of children, **the current study reported** that near half of the total samples have 1-3 children. **This finding was in agreement with Soliman(2018) [40],** who showed that about half of the total sample have 1- 4 children. **This finding contradicted with Mahdy and Ali(2012)[41],**who revealed that more than two thirds of participated women were having more than 3 children.

Concerning to place of residence, the present study showed that slightly more than half of the total samples lives in rural areas. This finding was supported with **Sim(2016) [42]**,who reported that women with breast cancer came from rural areas. This finding of the present study contradicted with **Pakseresht (2019) [43]**, who stated that a large number of breast cancer patients were living in urban areas.

In relation to educational level, the current study showed that near half of the total samples were have moderate education that interpret early detection of cancer at the first stage, **this result was in agreement with Beiki (2015)[44]**, who reported that about less than half of the total sample were moderate education, **also this finding was in agreement with Ahmed and Dawood(2017)[45]** (who found that two-thirds of the studied sample were secondary educated. **This finding contradicted with Abd El-razik (2013), [46]** who reported that the highest percentage of the studied groups were illiterate.

Regarding the incidence of menopause, the present study revealed that more than half of the control group were pre menopause while more than two-thirds of the study group and have a regular menstrual period .This may be interpreted that less than half of the study group and more than half of the control group were in the age group from 30-<40 year. **This finding was accepted with Parveeet (2017)[46,47],** who showed that less than a third of women were premenopausal. **This result contradicted (Nessa et al., 2018)[116]** who reported that the highest percentage of studied women was above 40 years and postmenopausal

Regarding family history, the curren1t study revealed that most of both study and control groups had a negative family history. This means that specific genetic abnormalities that don't contribute to the development of breast cancer have been inherited (didn't passed from parent to child). [48] **This finding was similar Hawash (2018) [49],** who found that the highest percentage of their patients had a negative family history. **This finding was in line with Mahdy (2014)[50],** who showed that the highest percentage of their patients had a negative family history and had no pa0st experience about breast cancer. **This result**

contradicted with **Hagrass (2012)**, [50] who reported that a higher percentage of studied patients had positive family history especially first relative degree related to genetic factors.

Concerning to clinical data It shows that most (76.7%) of the study group and (70%) of the control group had a past history of anemia and also this results reveals that more than quarter of the total samples had a past history of hypertension. the current study showed that most of the total sample had a past history of anemia and also this results revealed that more than quarter of the total samples had a past history of hypertension, this finding was supported with **Gilreath (2014)**[51] ,who revealed that more than quarter of the total samples had a past history of anemia and hypertension**,** also this result was supported with **Bray**(**2018)**[52]**,** who mentioned that about quarter of the total sample had past history of anemia**.**

In relation to stage of breast cancer, this result found that near half and more than half of the total samples have first degree and second degree breast cancer respectively. **This result was in support with Musarezaie and Zargham-Boroujeni (2015)**[53] that showed that a higher percentage of the studied groups were diagnosed at the secondstage.

Regarding to gastrointestinal manifestation, this results shows that less half of the study group haven̓t gastrointestinal manifestation before first session of chemotherapy but the percentage increased to more than half at third months of follow up compared to the control group have no gastrointestinal manifestation before first session of chemotherapy but the percentage decreased at third months of follow up .Also these results found that about third of the study group suffering from loss of appetite before first session of chemotherapy but the percentage decreased to minority at third months of follow up compared to third of the control group suffering from loss of appetite before first session of chemotherapy and still with the same percentage at third months of chemotherapy sessions**,** this finding was supported with **Komal (2020)**[54]**,** who

revealed that about half of study group maintain good nutrition had decreased gastrointestinal manifestation.

Concerning to body mass index (BMI), the current study revealed that less than half of the study group over ideal body weight before first chemotherapy sessions compared to slightly more than half at third months after chemotherapy sessions and it can be also found that third of the same group suffering from obesity before first chemotherapy sessions compared to minority at third months after chemotherapy sessions, this result was in agreement with **Karan(2019)** [55]**and Julia (2017),** who mentioned that majority of patients who maintained good nutrition had ideal body weight.

This results shows body mass index (BMI) of the study samples throughout the period of follow up. It reveals that less than half of the study group over ideal body weight before first chemotherapy sessions compared to slightly more than half at third months after chemotherapy sessions and it can be also found that third of the same group suffering from obesity before first chemotherapy sessions compared to minority at third months after chemotherapy sessions. Also this results shows that of the control group before first chemotherapy sessions compared to slightly more than half at third months after chemotherapy sessions suffering from obesity [56-57]

Regarding to signs of malnutrition of the study group at three months post chemotherapy sessions in relation to socio-demographic data, it represents that most of the study group have signs of malnutrition were in the age group 40-<50 year. This result was in agreement with Rafaella (2015) who reported that age ≥60 years were associated with increased risk of malnutrition were associated with the presence of malnutrition

Concerning dietary intake and signs of malnutrition of the study group at three months post chemotherapy sessions. This study showed that there was a significant negative correlation between dietary intake and signs of malnutrition.

This result was in agreement with **Casari (2021)** who mentioned that no significant association between nutritional status and gastrointestinal symptoms was found[58,59]

Conclusion

Based on the findings of the present study, it can be concluded that:An improvement of nutritional parameter and less chemotherapy nutritional side effects of the study group than the control group ,so the early nutritional program is more effective on improving health status and reducing gastrointestinal side effect of chemotherapy for breast cancer patients .

Recommendations

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

-Breast cancer patients should maintain on healthy life style and keeping on especial diet during chemotherapy session
-Nursing staff must focusing on early assessment of malnutrition signs and symptoms and dietary intake for breast cancer patients undergoing chemotherapy
-Nurse should identify how to calculate ideal body weight for those patients, to identify who are at risk for developing underweight or overweight and record results.
-Planned post discharge education should be prepared and given to breast cancer patients especially undergoing chemotherapy as well as systemic education during the period of follow up.
-Conducting of comprehensive health educational programs for women following breast cancer to maintain good health status.
-The study should be replicated on large sample and different hospitals setting in order to generalize the results.

Reference

1- Allred DC. Ductal carcinoma in situ: terminology, classification, and ..natural history. J Natl Cancer Inst Monogr, 2018 ; (41) :134-8. 1Bray F, Laversanne M, Weiderpass E, Soerjomataram I.

2- World Health Organization (WHO). Global Health Estimates 2020: Deaths by Cause, Age, Sex, by Country and by Region. WHO; 2020.. who.int/data/gho/data/themes/mortality-and-global-health estimates/ghe-leading-causes-of-death https://cancerstatisticscenter.cancer.org Accessed on 27 September 2020.

3-Davis Lynn BC, Chernyavskiy P, Gierach GL, Rosenberg PS. Decreasing incidence of estrogen receptor-negative breast cancer in the United States: trends by race and region. J Natl Cancer Inst. 2022;114(2):263–270.

4-A statistical record of Tanta Cancer Center at 2020.

5- The Global Cancer Observatory - All Rights Reserved - December, 2020.

6- Ahmed S., Dawood W., (2017): Effect of an Educational Supportive Program on Mastectomy Patients'

Satisfaction, IOSR Journal of Nursing and Health Science , Vol.6, N. 6, pp.66-74.

7- Anderson, W, Rosenber, P, Prat, A.; Perou, C, Sherman, M.E. How many etiological subtypes of breast cancer: Two, three, four, or more? J. Natl. Cancer Inst. 2014, 106 :165.

8- Coa, K., Epstein, J., Ettinger, D., Jatoi, A., McManus, K., Platek, M., &Moskowitz, B., (2015): The impact of cancer treatment on the diets and food preferences of patients receiving outpatient treatment. Nutrition and cancer, 67(2),Pp. 339-353.

9-Eraky, A.S.(2016):Effect of nursing intervention on traumatic stress and coping strategies among women with breast cancer. M. Sc. Thesis in Maternal and New born Health Nursing for Doctorate degree, Faculty of Nursing, Menoufiya University, Egypt

10- Breast cancer. Rochester, Minn.: Mayo Foundation for Medical Education and Research; 2017. Coa, K., Epstein, J., Ettinger,

D., Jatoi, A., McManus, K., Platek, M., &Moskowitz, B., (2015): The impact of cancer treatment on the diets and food preferences of patients receiving outpatient treatment. Nutrition and cancer, 67(2),Pp. 339-353.

11-Masmouei B., Harorani M., Ghafarzadegan R., Davodabady F., Zahedi S., Davodabady Z., (2019): The effect of progressive muscle relaxation on cancer patients' self-efficacy, Complementary therapies in clinical practice, vol. 34, N.6 ,pp.70-75.

12-Forouzanfar, M. H., Afshin, A., Alexander, L. T., Anderson, H. R., Bhutta, Z. A., Biryukov, S., … Murray, C. J. L. (2016). Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: A systematic analysis for the Global Burden of Disease Study 2015.

13-Ahmed S., Dawood W., (2017): Effect of an Educational Supportive Program on Mastectomy Patients' Satisfaction, IOSR Journal of Nursing and Health Science , Vol.6, N. 6, pp.66-74.

14- Bahgat Z., Alaa Elden S., Atia N., El Sheik E., Elshemy M., (2016): The Efficacy of Protocol of Care on Post Mastectomized Women Outcomes. IOSR Journal Of Nursing And Health Science, Vol. 5, N. 5, pp. 49-64.

15-James, F., Wootton, S., Jackson, A., Wiseman, M., Copson, E., &Cutress, R., (2015): Obesity in breast cancer–what is the risk factor?. European journal of cancer, 51(6), Pp.705-720.

16-US National Institutes of Health. Ending structural racism. 2021. https://www.nih.gov/ending-structural-racism. Accessed February 9, 2022..

17-Breast cancer. Fort Washington, Pa.: National Comprehensive Cancer Network. http://www.nccn.org/professionals/physician_gls/f_guidelines.asp. Accessed June 28, 2017

18/http://www.shutterstock.com/s/breast issue, 2016.

19- Breast cancer. Rochester, Minn.: Mayo Foundation for Medical Education and Research; 2017.

20- Ginsburg O, Yip CH, Brooks A, Cabanes A, Caleffi M, Dunstan Yataco JA, et al. Breast cancer early detection: A phased approach to implementation. Cancer. 2020; 126 Suppl 10: 2379-21. http://www.ncbi.nlm.nih.gov/pubmed/32348566

22- Breast cancer org , 120 East Lancaster Avenue, Suite 201 Ardmore , PA 19003© 2021 Breast cancer .org- https://www.breastcancer.org/risk/factors

23- Braakhuis, A J, Campion, P, Bishop K S. Reducing breast cancer recurrence: The role of dietary polyphenolics. Nutrients. 2016, 8, 54

24-Ferlay, J.; Hery, C.; Autier, P.; Sankaranarayanan, R., Global Burden of Breast Cancer. In Breast Cancer Epidemiology; Springer: New York, NY, USA, 2018, pp: 1–19.

25. De Cicco, P., Catani, M., Gasperi, V., Sibilano, M., Quaglietta, M., Savini, I. Nutrition and Breast Cancer: A Literature Review on Prevention, Treatment and Recurrence. Nutrients 2019, 11: 1514

26. Porter, P. . 2018 ,Westernizing" women's risks? Breast cancer in lower-income countries. N. Engl. J. Med, 358,213–216.

27. Cancer Statistics Center. Available online: https://cancerstatisticscenter.cancer.org . Acccessed on 27 September 2018).

28-Chan D., Vieira A., Aune D., et al. Body mass index and survival in women with breast cancer-systematic literature review and meta-analysis of 82 follow-up studies. Ann Oncol. 2014;25:1901–1914.

29-Arends J, Bachmann P, Baracos V, Barthelemy N, Bertz H, Bozzetti F, Fearon K, Hutterer E, Isenring E, Kaasa S, Krznaric Z, Laird B, Larsson M, et al. ESPEN guidelines on nutrition in cancer patients. Clin Nutr. 2017; 36:11-48.

30-Montoya J E, Domingo F Jr, Luna C A, Berroya R M, Catli C A, Ginete J K, Sanchez O S, Juat N J, Tiangco B J, Jamias J D.2015, Nutritional status of cancer patients admitted for chemotherapy, Singapore MedicalJournal; 51(11):860-864.

31-Breast cancer. Canadian Cancer Society (2015) http://www.cancer.ca/en/cancer-information/cancer-type/breast/signs-and-symptoms/?region=on#ixzz3xScycfqvAccessed on January 16, 2016Template:WH Template:WS

32-Sieri S, Chiodini P, Agnoli C, Pala V, Berrino F, Trichopoulou A, et al. Dietary fat intake and development of specific breast cancer subtypes. J Natl Cancer Inst. 2014;106(5):dju068.

33-Guo Q, Burgess S, Turman C, Bolla MK, Wang Q, Lush M, et al. Body mass index and breast cancer survival: a Mendelian randomization analysis. Int J Epidemiol. 2017;46:1814–1822. [PMC free article] [PubMed] [Google Scholar]

34- Heal Well. A cancer nutrition guide, American Institute for Cancer Research.2013: Available at www.aicr.org. Accessed June 15.

35-Manoochehri J., Abdollahi A., & Tajik A., (2018): Epidemiological study of breast tumors in Iranian patients, academic research international, vol. 9, N. 1, pp.35-38.

36-Magtanong E., Nguyen D., Kim H., (2018): 212 Outcomes of breast reconstruction following nipple-sparing mastectomy in a single academic institution, Journal of Investigative Medicine, vol.66, N.1, Pp.247-257

37- Gagliato DdeM, Lei XGiordanoSH, et al. Impact of delayed neoadjuvant systemic chemotherapy on overall survival among patients with Breast Cancer .Oncologist 2020;25(9):749-757 https://doi.org/10.1634/THEONCOLOGIST.2019-0744

38- Coa, K., Epstein, J., Ettinger, D., Jatoi, A., McManus, K., Platek, M., &Moskowitz, B., (2015): The impact of cancer treatment on the diets and food preferences of patients receiving outpatient treatment. Nutrition and cancer, 67(2),Pp. 339-353.

39-James, F., Wootton, S., Jackson, A., Wiseman, M., Copson, E., &Cutress, R., (2015): Obesity

in breast cancer–what is the risk factor?. European journal of cancer, 51(6), Pp.705-720

40- Jarvandi, S., Pérez, M., Schootman, M., & Jeffe, D., (2016): Pre-Existing Diabetes in Early Stage Breast Cancer Patients is Associated with Lack of Improvement in Quality of Life 2 Years After Diagnosis. International journal of behavioral medicine, 23(6),Pp. 722-729.

41- Hoffmann T., Corrêa-Fissmer M., Duarte C., Nazário R., Barranco A., & Oliveira, K., (2018): Prevalence of dermatological complaints in patients undergoing treatment for breast cancer, Anais Brasileiros de Dermatologia, Vol. 93, N. 3, pp.362-367.

42-Soliman G., El Gahsh N., Shehata O., (2018): Effect of a planned educational program regarding post-mastectomy exercises on living activities among breast cancer patients, National Journal of Advanced Research, Vol. 4, N. 1, pp.1-11.

43-Hayes S., Johansson K., Stout N., Prosnitz R., Armer J., Gabram S., Schmitz K., (2012): Upper-body morbidity after breast cancer: incidence and evidence for evaluation, prevention, and management within a prospective surveillance model of care, Vol. 118, N. 8, pp.2237-2249.

44-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, vol. 8, N. 12, pp.1003-1017

45-117- Sim X, Ali R, Wedren S, et al. Ethnic differences in the time trend of female breast cancer incidence: Singapore. BMC Cancer, 2016; 5(6): 70-261.

46- Pakseresht S, Ingle G K, Bahadur A K, et al. Risk factors with breast cancer among women in Delhi. Indian J Cancer, 2014; 5(46):8-132.

47- Beiki O., Hall P., Ekbom A., Moradi T., (2012): Breast cancer incidence and case fatality among 4.7 million women in relation to social and ethnic background, Breast Cancer Research, Vol. 14, N. 1, pp. 5.

48-Ahmed S., Dawood W., (2017): Effect of an Educational Supportive Program on Mastectomy Patients' Satisfaction, IOSR Journal of Nursing and Health Science , Vol.6, N. 6, pp.66-74.

49-Abd El Razik S. Effect of educational program on quality of life for patients with cancer undergoing chemotherapy, published Ph. D. Thesis, Faculty of Nursing , Banha Univ, 2015; 104-105.

50- Parvee S, Shahid M. Prognostic factors in stage-I breast cancer: A retrospective study. J. Pak. Med. Assoc, 2017; 47(4): 117-118

51-Nessa A., Hussain T., Alam S., Faruk I., Jahan I., (2018): Age distribution pattern of female breast cancer patients in Bangladesh-developing early and presenting late, International Surgery Journal, Vol. 5 , N.2, pp.379-382..

52-Hagrass S., Allah E., Hassan S., Sawy W., (2012): Improving the quality of life for women with arm lymphedema post-mastectomy in Zagazig City, Aust J Basic Appl Sci, Vol. 6, N.3, pp.428-442. 11.

Harorani M., Safarabadi M., Jadidi A., Seavey J., Masmouei B., & Bazrafshan M., (2018): Relationship Between Self-Efcacy and Self-Eseem in Patients With Cancer, Journal of Client-Centered Nursing Care, V.4, N.1, pp.45-52.

53-Hawash M., Alaa Eldeen S., El Shatby A., ElMoghazy H., Hamida M., (2018): Effect of the nursing rehabilitation program on the prevention of lymphedema among post-mastectomy women, IOSR Journal of Nursing and Health Science , Vol.7, N. 6, pp.68-87.

54-Manoochehri J., Abdollahi A., & Tajik A., (2018): Epidemiological study of breast tumors in Iranian patients, academic research international, vol. 9, N. 1, pp.35-38.

55-1 Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global Cancer Statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018;68(6):394-424.
http://doi.org/10.3322/caac.21492 .

56- : Musarezaie A, Zargham-Boroujeni A. Quality of life and related factors among the women undergoing mastectomy. Irani Journal of Nursing and Midwifery Research 2015;20:287-91.

57- Song Y., Lv X., Liu J., Huang D., Hong J., & Wang W., (2016): Experience of nursing support from the perspective of patients with cancer in mainl and China. Nursing & Health Sciences, V.18, N.4, pp.510- 18.

58-Singh, Komal, et al. "gastrointestinal symptoms are associated with chemotherapy-induced nausea in patients with breast cancer." ONS 45th Annual Congress. Ons, 2020.

59-Cicco P, Catani MV, Gasperi V, Sibilano M, Quaglietta M, Savini I. Nutrition and breast cancer: a literature review on prevention, treatment and recurrence. Nutrients. 2019;11(7):e1514. http://doi.org/10.3390/nu11071514

60-3- De Cicco, P., Catani, M., Gasperi, V., Sibilano, M., Quaglietta, M., Savini, I. Nutrition and Breast Cancer: A Literature Review on Prevention, Treatment and Recurrence. Nutrients 2019, 11: 151