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Effect of Back massage on Fatigue and Anxiety among Cancer Patients Receiving Chemotherapy

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Abstract: **Cancer-related fatigue is one of the most prevalent symptoms patients with cancer experience, both during and after treatment and in disease-free survivors. Anxiety have been found to correlate with Cancer-related fatigue. Back massage, a nursing intervention, is one of the complementary treatment approaches that have an important place in the control of fatigue and anxiety suffered by patients receiving chemotherapy. Aim of the study: To evaluate the effect of back massage on fatigue and anxiety among cancer patients receiving chemotherapy. Research design: A quasi-experimental design was utilized. Setting: The study was conducted at the outpatient oncology clinic at Fayoum University Hospital. Methods: A purposive sample of 60 adult patients from both genders who were randomly and alternatively divided into two equal groups study and control (30 patients in each). Tools: data collection tool included: Interview patient's assessment sheet, state-trait anxiety inventory scale(STAI), brief fatigue inventory scale (BFI). Results: The study revealed that there was a significant decrease in the level of fatigue and the mean anxiety scores among study group after implementing back massage. Conclusion: Back massage given during chemotherapy is effective nursing intervention in reducing anxiety and fatigue among studied patients. Recommendations: Apply back massage as a supportive care for cancer patients receiving chemotherapy.**

Keywords: **Back Massage, Fatigue, Anxiety, Cancer, Chemotherapy.**

1. INTRODUCTION

Chemotherapy is a systemic treatment that may produce many and varied side effects, both long and short term throughout the body. These effects will vary depending on the doses and combinations of the drugs prescribed. Some common side effects are: nausea and vomiting, diarrhea, stomatitis, anorexia, bone marrow depression, risk of infertility, alopecia, fatigue, renal toxicity, cardiac toxicity, extravasations and central nervous system toxicity. It is essential that relevant health care professionals have a good knowledge of the possible side effects of the chemotherapy, which is being delivered so that they can ensure the patientis fully informed **(1).**

Cancer-related fatigue (CRF) is frequently experienced by patients with cancer, and it can interfere with patients' usual functioning. CRF is defined as a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity and interferes with usual functioning. Occurs regardless of race, cancer type, stage, or treatment and can have severe physical, mental, economic, and social consequences **(2).**

Patients with cancer are increasingly using complementary therapies, that aim to relieve disease symptoms, reduce the adverse effects of conventional treatments, and improve perceived well-being and quality of life. Massage and aromatherapy massage have been reported as the most commonly used complementary therapies in the United Kingdom's National Health Service. Massage is defined as manipulations of the soft tissues of the body performed by the therapist's hands in order to affect the vascular, muscular and nervous systems **(3).**

Significance of Study:

Cancer-Related Fatigue (CRF) is one of the most prevalent symptoms of patients with cancer experienced, both during and after treatment. It is a prevalent condition among patients with cancer and survivors that occur across all ages, genders, cancer diagnoses, stages of disease, and treatment regimens **(4)**.

Psychological issues can occurs during chemotherapy. Anxiety is prevalent in patients who are diagnosed with cancer. Studies showed as much as 78% of all cancer patients displayed or reported anxiety. Further, approximately 48% qualified for a diagnosis of anxiety disorder **(5)**. Patients receiving chemotherapy had biochemical changes in their brain that affect their cognitive and psychological status and increase their anxiety levels **(6)** .

2. AIM OF THE STUDY

The aim of the present study was to evaluate the effect of back massage on fatigue and anxiety among cancer patients receiving chemotherapy through the following objectives:-

1) Assess patient's level of fatigue and anxiety.

2) Implement back massage for cancer patients receiving chemotherapy.

3) Evaluate the effect of implemented back massage on patient's fatigue and anxiety.

3. THE RESEARCH HYPOTHESIS

At the end of the study patients who will receive back massage techniques during chemotherapy session will experience less fatigue intensity and less anxiety as measured by brief fatigue inventory, and State-Trait Anxiety Inventory (STAI) scales compared with patients who will not receive back massage.

Design:

A quasi-experimental research design was utilized in the present study.

Setting:

The present study was conducted at Oncology Outpatient Clinic at Fayoum University Hospital.

Subjects:

A purposive sample of 60 adult patients from both genders receiving chemotherapy from the above mentioned setting and divided into two equal study & control groups (30) patients for each group).

Inclusion criteria:

1. Adult Patients from both gender receiving chemotherapy agrees to participate in the study.
2. Patient who received the third or more chemotherapy cycles.
3. Patient who will receive chemotherapy for less than 8 hours.

Exclusion criteria:

1- Patient receiving first cycle chemotherapy**.**

2- History of other chronic disease such as heart disease.

3- Who have open wounds, fractures or luxation in the back, neck, and shoulders.

4- Known history of psychiatric illness as depression, chronic anxiety or being treated with psychotropic drug .

Tools of Data Collection:

Three tools were used to collect the data according to the following:

Tool I : Interview Patient's assessment sheet :

It's an interview administered questionnaire that adapted from **(7)** and the investigator makes some changes to be suitable for the present study and consists of the following two parts that were filled by the investigator and **it's includes:**

***Part 1*:** Socio-demographic data, which include age, gender, marital status, education, and occupation.

Part 2: Medical history which include the following : Medical diagnosis, stage of cancer, total chemotherapy treatment cycles, recent treatment cycle that include, chemotherapeutic regimen currently received, factors likely to aggravate the level of fatigue, factors likely to alleviate the level of fatigue and past medical and surgical history.

Tool II: Spielberger State-Trait Anxiety Inventory scale/STAI:

It was developed by **(8)** in order to determine the state and trait anxiety levels separately; it is a self-report questionnaire consisting of 20 item scale for each.

Tool(III) : Brief Fatigue Inventory scale/BFI

It developed by **(9).**it includes nine items, three items measure fatigue intensity and six items measure fatigue interference with daily activities in the past 24hours. Reply for each item is rated on a ten-point measure, with 0 equivalents to no fatigue (or no interfering) at all and 10 equivalents to the most awful fatigue (or interfering) patient could see.

Operational design

The operational design includes preparatory phase, content validity of the modified tool and reliability, pilot study and fieldwork.

A. Validity:

Content validity was conducted to determine whether or not the instrument measures what it is designed to measure. The tools were revised by a jury of 5 experts who composed of two professors of medical surgical nursing at Cairo university, three lecturers of medical surgical nursing at fayoum university**.** The experts reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance and applicability. Minor modifications were done

B. Reliability:

Reliability of the tool was tested to determine the consistency of the measurement instrument. The degree to which an instrument measures the same way each time it used under the same condition with the same subjects. The Cronbach's alpha model, which is a model of internal consistency, was used to test tool reliability. Reliability factor of the second tool State-Trait Anxiety Inventory (0.843) and Brief Fatigue Inventory (tool III) was = 0.793. Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1; higher values (more than 0.7) denote acceptable reliability.

C. Pilot study:

A Pilot study was carried out with 10% (not less than 10 patients) of the sample under study to test the applicability, clarity and efficiency of the tools, then the tools modified according to the results of the pilot study, patients whom shared in pilot study not included in the sample and replaced by other patients.

Ethical consideration:

An approval was obtained from a scientific research ethics committee of the faculty of Nursing at Helwan University, oral and written informed consent was obtained from the study subjects individually before starting the study. The aim and objectives of the study was clarified to the patients included in the study by the investigator. Participants were assured that anonymity and confidentiality would guarantee. Patients were informed that they are allowed to choose to participate or withdraw from the study at any time. Ethics, culture, values were respected.

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Field work includes three phases:

I-First phase (Assessment phase):

During this stage each patient was assessed individually and data collection was filled by the investigator before starting the chemotherapy infusion, by using tool (I) patient assessment sheet that filled for the study and control groups by the investigator it took around (5) minutes. Then the level of fatigue and anxiety were assessed for each patient using tool (II) state-trait anxiety inventory scale (STAI), and tool (III**)** Brief fatigue inventory (BFI) it took around (20) minutes.

II-Second phase (Implementation phase):

Preparation:

The chemotherapy nurse admits patients presenting to the unit to have chemotherapy, then prepares and implements the chemotherapy regimen according to the chemotherapy protocol determined previously for each individual patients. Within the first 30 minutes after the patient's admittance to the chemotherapy unit the patient in study group was informed about the purpose and duration of the massage before the massage was started. Patients in the study group had repetitive back massage which implemented by the investigator as following:

1- Before the infusion of chemotherapy:

Patients in the study group had back massage for 15 minutes before the infusion. Back massage implemented by the investigator as following:

(1) The environment where the massage was implemented was appropriately arranged by checking whether the door and windows were closed in order that the ambient temperature in the chemotherapy unit should be maintained.

(2) Patient's privacy was protected by separating him/her from others with a folding screen, and the patient's back was exposed while he/she was sitting or lying in the recliner.

(3) The investigator warming his/her hands by rubbing, put on some Vaseline to make them slippery.

(4) The massage was started from the waist with long-slow effleurage and continued to the neck with circular movements. Effleurage is the application of unbroken gliding movements that are repeated and follow the contour of the client's body. Over the scapulae, the hands were separated from each other and stroking was continued and repeated several times in larger circular movements. Effleurage was implemented during the first 5 and last 4 minutes of the 15-minute back massage.

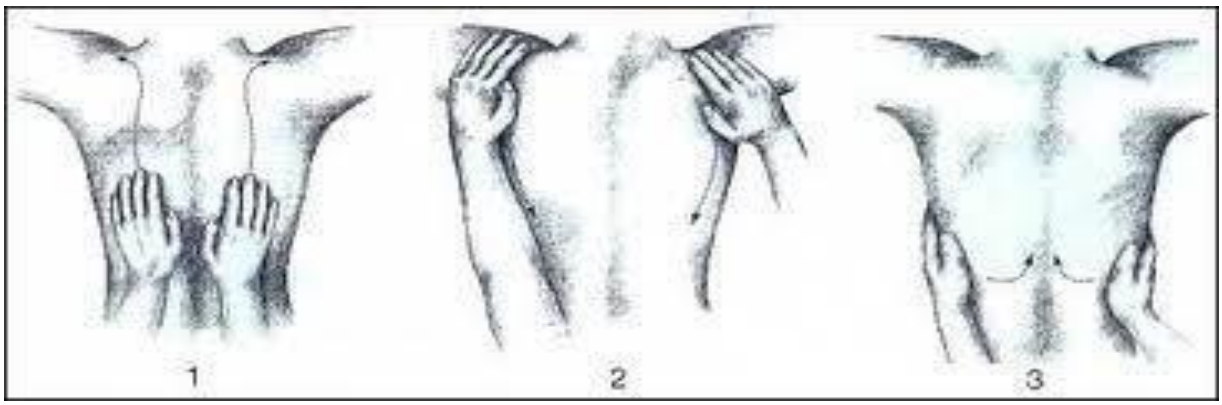

Figure. 1: steps of effleurage technique. Available at http://081089rwv.1105.y.http.ovidsp.tx.ovid.com.mplbci.ekb.eg accessed 17-3-2019 at 12:55 am.

(5) After completing the effleurage phase of the massage, starting around the waist, the investigator maintained the back massage with petrissage by grasping the subcutaneous tissues and muscles with the thumb and other fingers. Kneading movements were started from the waist and continued to shoulders and arms, and then back to the waist again. Petrissage was implemented for 3 minutes between the sixth and ninth minutes of the 15-minute back massage.

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Figure. 2: petrissage back massage technique. Available at https://www.amazon.com/Charlotte-Michael-Versagi/e/B0052XUUPU. accessed 17-7-2019 at 11:54pm.

(6) After petrissage, back massage was continued through friction movements. Frictions are localised manipulations performed onto soft tissues with fingers or thumbs. The thumb tips were placed one on the other and the massage was started from the sacroiliac junction, and circular friction movements applied with fingertips continued along the vertebra to the occipital region. Friction was applied for 3 minutes between the 9th and 12th minutes of the 15-minute back massage.

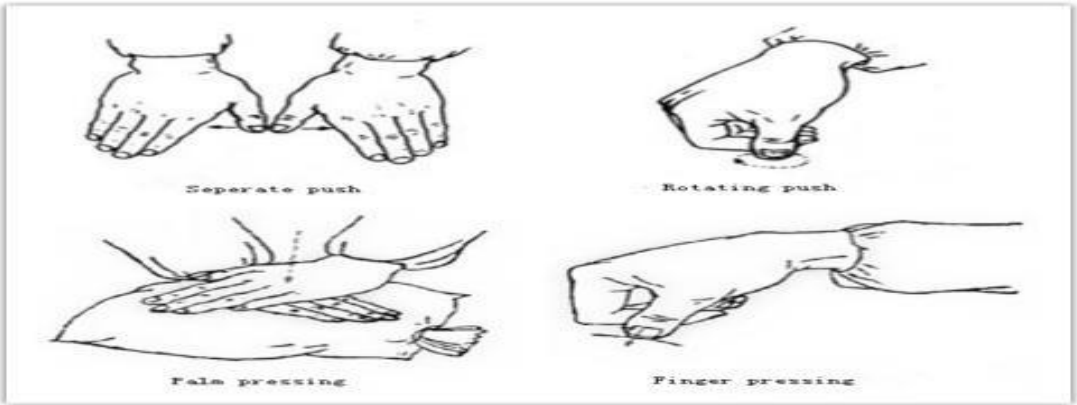

Figure. 3: Friction massage . Available at https://musculoskeletalkey.com/massage-and-soft-tissue-manipulation/ . accessed 18-7-2019 at 10:54pm.

(7) Before the massage was over, effleurage was applied again for the last 4 minutes of the 15-minute back massage.

(8) After the back massage was over, the researcher removed the Vaseline on the back of the patient with a towel and helped the patient to wear his/her clothes. The application was finalized after placing the patient in a comfortable position.

2) During the chemotherapy process (infusion):

Chemotherapy cycles administered to the patients included in the study were minimum 2-hours and maximum 3-hours cycles. Thus patients received 15 minutes back massage of each one hour period:

- After 25 minutes of the first hour of starting the chemotherapy infusion the investigator implement back massage for 15 minutes in the same manner as implemented before the infusion.
- After 25 minutes of the second hour of the infusion the investigator implement back massage for 15 minutes as planned.

- If 3-hours cycle; after 25 minutes of the third hour of the infusion the investigator implement back massage for 15 minutes

3) After completing the infusion :

After finishing the chemotherapy infusion the investigator implement back massage for 15 minutes. STAI (tool II) and BFI (tool III**)** were re-applied after chemotherapy. To determine the effects of back massage on acute fatigue and state anxiety.

III-Third phase (Evaluation phase):

1- First phase of evaluation: before starting the chemotherapy infusion.

2- Second phase of evaluation : immediate, and after 24 hours following chemotherapy to evaluate the effect of implemented back massage on acute fatigue level.

Statistical Analysis

- Data were collected and coded to facilitate data manipulation and double entered into Microsoft Access and data analysis was performed using Statistical Package of Social Science **(SPSS)** software version 18 in windows 7.
- Simple descriptive analysis in the form of numbers and percentages for qualitative data, and arithmetic means as central tendency measurement, standard deviations as measure of dispersion for quantitative parametric data.
- Quantitative data included in the study was first tested for normality by One-Sample Kolmogorov-Smirnov test in each study group then inferential statistic tests were selected.

For quantitative parametric data :

- In-depended **student t-Test** used to compare measures of two independent groups of quantitative data
- **Paired t-test** in comparing two dependent quantitative data.

For qualitative data

- **Chi square** test to compare two of more than two qualitative groups.
- **Bivariate Pearson correlation test** to test association between variables
- **General linear model to compare repeated** measures.

- The **P-value≤ 0.05** was considered the cut-off value for significance.

4. RESULT

Table (1): Frequency and percentage distribution of socio-demographic data for Both Study and Control groups (N:60).

sociodemographic Variables	Study Group (n=30)		Control Group (n=30)		t-test	p-value
Age (years)						
Mean ±SD	45.8±10.9		41.1±7.5		1.9	0.06
Gender					**X^2- test**	**p-value**
Male	10	33.3%	11	36.7%	0.07	0.9
Female	20	66.7%	19	63.3%		
Marital status						
Single	1	3.3%	1	3.3%	2.4	0.5
Married	23	76.7%	27	90%		
Widow	4	13.3%	1	3.3%		
Divorced	2	6.7%	1	3.3%		

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Level of education						
Illiterate	7	23.3%	8	26.7%	1.3	0.9
Primary	5	16.7%	3	10%		
Preparatory	3	10%	2	6.7%		
Secondary	11	36.7%	14	46.7%		
University	4	13.3%	3	10%		
Occupation						
Not working	20	66.7%	18	60%	0.43	0.8
Worker	5	16.7%	7	23.3%		
Employer	5	16.7%	5	16.7%		

*statistical significant p-value ≤0.05

Table(1) illustrates that there is no statistically significant difference between study and control groups with p-value >0.05 ,as regards age, gender, marital status, level of education, and occupation, which indicated proper matching between study and control groups in these variables.

Table illustrates that The mean age of the studied patients in both study and control groups was(45.8±10.9 , 41.1±7.5) respectively. Majority of the studied patients in both study and control groups were females (66.7%, 63.3%) respectively. Majority of the patient in both study and control groups were married (76.7%, 90%) respectively, as regards to educational level for patients in both study and control groups the majority of them completed secondary education (36.7%, 46.7%) respectively , as regards to occupation majority of the studied patients in both study and control groups were not working (66.7%, 60%) respectively .

Table (2): Frequency and percentage distribution of Medical diagnosis and stage of cancer for Both Study and Control group (N:60).

Medical history	Study Group (n=30)		Control Group (n=30)		X^2-test	p-value
	No.	%	No.	%		
1- Medical diagnosis						
Breast cancer	13	43.3%	10	33.3%	4.7	0.6
Colon cancer	7	23.3%	6	20%		
Lung cancer	5	16.7%	4	13.3%		
Ovarian cancer	3	10%	4	13.3%		
Bladder cancer	2	6.7%	2	6.7%		
Renal cell carcinoma	0	0%	3	10%		
Cheek basosquamous carcinoma	0	0%	1	3.3%		
2- Stage of cancer						
Stage 1	3	10%	4	13.3%	3.1	0.4
Stage 2	19	63.3%	14	46.7%		
Stage 3	8	26.7%	10	33.3%		
Stage 4	0	0%	2	6.7%		

*statistical significant p-value ≤0.05

Table (2) illustrates that there is no statistically significant difference between study and control groups as regards medical diagnosis and cancer stage with p-value >0.05; which indicated proper matching between study, and control groups in these variables.

On the other hand, majority of the studied patients in both study and control groups had breast cancer (43.3%, 33.3%) respectively followed by colon cancer (23.3%, 20%) respectively. As well majority of the studied patients in both study and control groups have stage 2 cancer.

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Table (3): Frequency and percentage distribution according to treatment characteristics for both study and control groups (N:60).

treatment characteristics	Study Group (n=30)	Control Group (n=30)			X^2-test	p-value
	No.	%	No.	%		
3-Recent chemotherapy treatment cycle received						
Third	13	43.3%	7	23.3%	0.3	NS
Fourth	10	33.3%	16	53.3%		
Fifth	5	16.7%	4	13.3%		
Sixth	1	3.3%	3	10%		
Seventh	1	3.3%	0	0%		
4- chemotherapy regime currently received					X^2-test	p-value
Taxol	6	20%	5	16.7%	17.3	0.1
Adriamycin	0	0%	4	13.3%		
Gemcitabine(Gemzar)	5	16.7%	6	20%		
FEC(Flouracil, epirubicin, Cychlophosphamide)	2	6.7%	1	3.3%		
Cisplatin	2	6.7%	0	0%		
Oxaliplatine	5	16.7%	4	13.3%		
Flouracil	0	0%	2	6.7%		
Combination	10	33.3%	8	26.7%		

*statistical significant p-value ≤0.05

Table(3) illustrates that there is no statistically significant difference with p-value >0.05 between study and control groups as regarding chemotherapy regime, recent treatment cycle; which indicated proper matching between two groups in these variables.

On the other hand majority of the studied patients in both study and control groups received the third and fourth chemotherapy cycle (43.3%, 33.3%) respectively, as well majority of the studied patients in both study and control groups received a combination of chemotherapy treatment (33.3%,26.7%) respectively, followed by taxol regimen (20% ,16.7%) in both study and control groups respectively.

Table (4): Frequency and percentage distribution according to Factors likely to aggravate or alleviate the level of fatigue, and surgical history for both study and control groups (N:60).

Variables	Study Group (n=30)		Control Group (n=30)		X^2-test	p-value
	No.	%	No.	%		
6- Factors likely to aggravate the level of fatigue						
Chemotherapy	**10**	**33.3%**	**7**	**23.3%**	13.7	**0.03***
Sleep disturbance	0	0%	5	16.7%		
Pain	2	6.7%	**7**	**23.3%**		
Anorexia	0	0%	1	3.3%		
Psychological distress	0	0%	1	3.3%		
Mixed factors	18	60%	9	30%		
7- Factors likely to alleviate the level of fatigue						
Rest	10	33.3%	7	23.3%	3.9	0.6

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Sleep	5	16.7%	4	13.3%		
Light activities	5	16.7%	4	13.3%		
Non	6	20%	8	26.7%		
Mixed factors	4	13.3%	7	23.4%		
8- past medical /Surgical history						
No	16	53.3%	16	53.3%	0	1
Yes	14	46.7%	14	46.7%		

*statistical significant p-value ≤0.05

Table (4) illustrates that there is statistically significant difference between study and control groups as regards factors that aggravate fatigue level as among study group the higher percentage of patients (33.3%) mention chemotherapy as a factor that aggravate fatigue with p-value 0.03 versus same percentage of (23.3%) for both chemotherapy and pain among control group.

Table (5): pre-intervention score of Fatigue inventory scale for both study and control groups (N:60).

Pre-assessment fatigue score	Study Group (n=30)		Control Group (n=30)		X^2- test	p-value
	No.	%	No.	%		
Before						
Mild	1	3.3%	2	6.7%	0.2	N.S
Moderate	24	80%	27	90%		
Severe	5	16.7%	1	3.3%		

*statistical significant p-value ≤0.05

Table(5) illustrates that there is no statistically significant difference between the study and control groups as regards pre-assessment fatigue score before practice back massage with p-value >0.05. with high percentage of moderate level was noted in both study and control groups (80%, 90%) respectively.

On the other hand there is no statistically significant difference between study and control groups as regards factors alleviated fatigue with p-value >0.05; which indicated proper matching between two groups in these variables.

Table (6): pre-intervention score of State-Trait Anxiety Inventory scale(STAI) for both study and control groups (N:60).

Variables	Pre-assessment anxiety score	t-test	p-value
	Mean ± SD		
Study Group	42 ± 7.1	-0.11	0.9
Control Group	42.2 ± 3.7		

*statistical significant p-value ≤0.05

Table (6) illustrates that there is no statistically significant difference between study and control groups as regards anxiety score assessment before practice back massage in study group for both study and control groups with p-value >0.05.

Table (7): Post intervention score of Fatigue inventory scale for both study and control groups (N:60).

Post assessment fatigue score	Study Group (n=30)		Control Group (n=30)		X^2- test	p-value
	No.	%	No.	%		
Immediate						
Mild	17	56.7%	11	36.7%	0.2	NS
Moderate	12	40%	15	50%		
Sever	1	3.3%	4	13.3%		

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After 24 hours of chemotherapy session						
Mild	**11**	**36.7%**	0	0%	**<0.001**	**HS**
Moderate	19	63.3%	25	83.3%		
Sever	0	0%	5	16.7%		

*statistical significant p-value ≤0.05

Table (7) show that there is statistically significant difference improvement in fatigue level with higher percentage of mild degree among study group following back massage intervention with p-value <0.001.

Table (8): post-intervention score of State-Trait Anxiety inventory scale(STAI) for both study and control groups (N:60)

Post-assessment anxiety score	Study Group (n=30)	Control Group (n=30)	T- test	p-value
	Mean± SD	Mean± SD		
Immediate	35.03 ± 4.2	44.4 ± 3.7	-9.2	**<0.001***
After 24 hrs	**32.57 ± 4.9**	43.77 ± 3.6	-10.1	**<0.001***
F- test	**45.2**	**5.55**		
p-value	**<0.001***	**0.05***		

*statistical significant p-value ≤0.05

Table(8) illustrates that there is statistically significant difference between study and control groups as regards anxiety score assessment immediate and post 24 hours after back massage practice in study group with lower mean of anxiety score among study group was noted (35.3±4.2, 32.57±4.9) respectively with p-value <0.001.

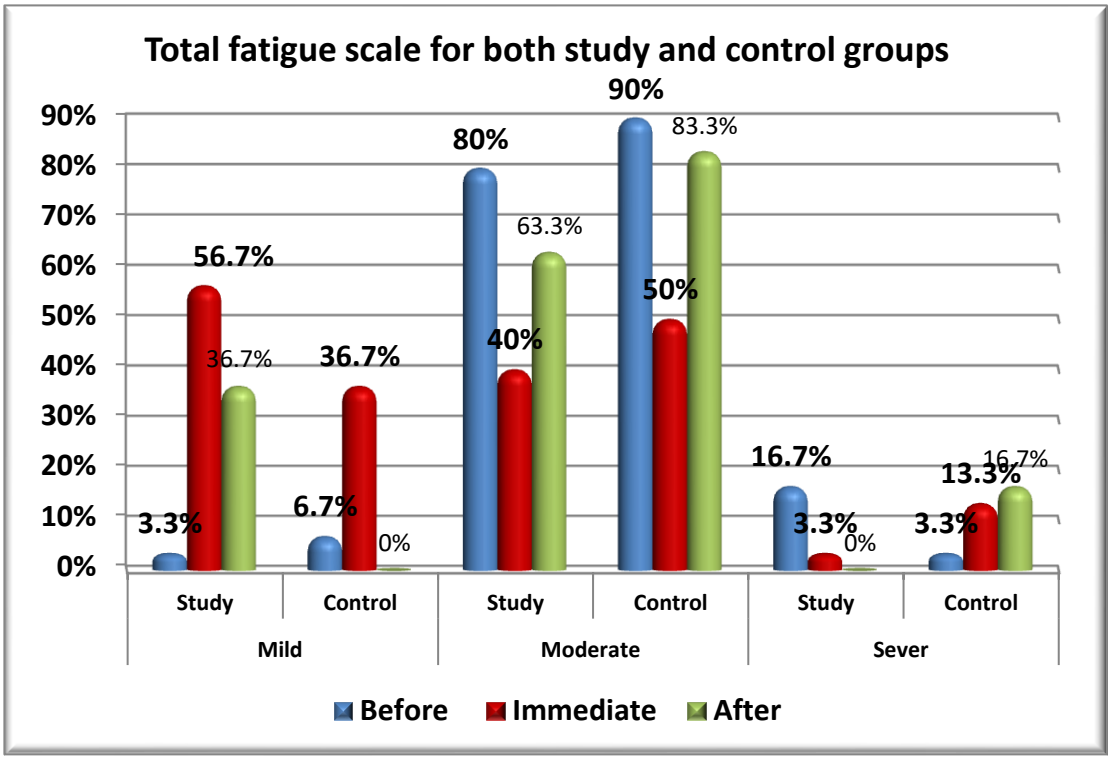

Figure (4) Total fatigue score before immediately and post 24 hours after practice back massage for both study and control groups (N:60).

Figure (4) shows that there is no statistically significant difference in fatigue level before practice back massage between both study and control groups. On the other hand there is an improvement in fatigue level with higher percentage of moderate degree among study group.

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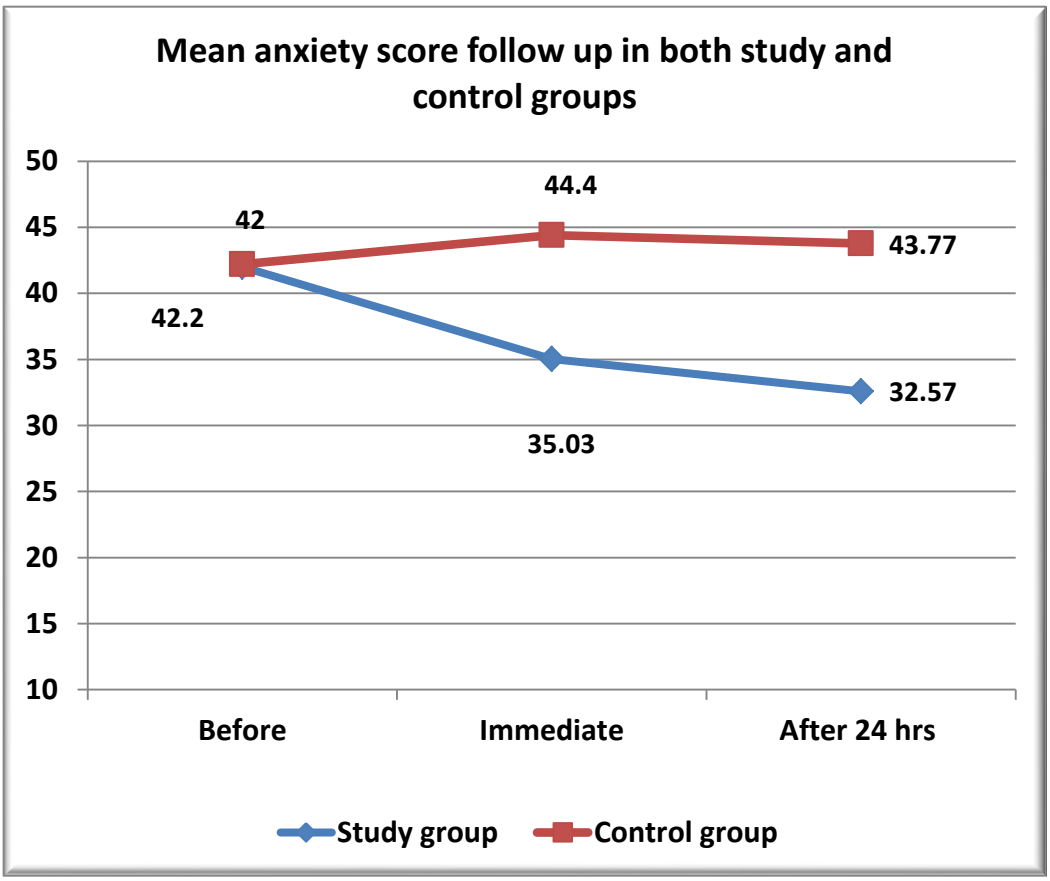

Figure (5): Show total anxiety score before , immediate and post 24 hours after practice back massage for both study and control groups (N:60).

Figure (5): illustrates that there is no statistically significant difference between study and control groups as regards pre-intervention anxiety mean score (42.2, 42) respectively.

On the other hand there is statistically significant difference between study and control groups as regards anxiety score immediate and post 24 hours of back massage practice in study group, with lower mean of anxiety score among study group was noted (35.3, 32.57) respectively.

5. DISCUSSION

Part I: Socio-demographic data for Both Study and Control groups.

In the present study, findings regarding to the patient's characteristics revealed that, the sociod-demographic and medical characteristics of subjects in both study and control groups, were not significantly dissimilar; this means that the participants were selected from identical population of cancer patients undergoing chemotherapy. The mean age of the studied patients in both study and control groups was (45.8±10.9 , 41.1±7.5) respectively. This finding agrees with **(10)** who conducted "Factors Affecting Quality of Life among Cancer Patients with Chemotherapy at Qena University Hospital in Upper Egypt"**,** reported that The majority of patients aged 22-75 years, with a mean age of (46.16).

Concerning gender, marital status and level of education, it was found that, more than half of the studied patients in both study and control groups were females, the majority of them were married and majority of them completed secondary education. This could be related to, females admitted to oncology units more than males due to breast, ovarian, and lung cancer. This result is supported by **(11)** who conducted "Effects of Walking Exercise Program on Chemotherapy Induced Fatigue, Physical Functional Status, and Symptoms Distress Among Cancer Patients. in inpatients departments of Mansoura oncology center" mentioned that, the most of the studied patients in both study and control groups were females, married, and were in secondary school.

As regards occupation majority of the studied patients in both study and control groups were not working. This could be related to, majority of patients were females as well as majority of them became disabled by the disease. This result is in line with **(12)** who conducted "The role of metacognitions in predicting anxiety and depression levels in cancer patients ongoing chemotherapy", reported that, the majority of the studied patients 69% were unemployed.

Part 2: Medical history and treatment characteristics for Both Study and Control groups.

Concerning medical diagnosis, it was found that, majority of the studied patients in both study and control groups had breast cancer, followed by colon cancer. this could be due to the high prevalence of breast cancer among females in different age groups. This result is in line with**, (13)** who conducted "Assessment of Anxiety and Depression among Adult Cancer Patients on Chemothherapy Regimens" pointed out that, the majority of the studied patients had breast and colon cancer.

Regarding cancer stage, this study showed that, the majority of the studied patients in both study and control groups were presented with stage II cancer. This finding agrees with **(14)** who conducted "Effect of Chemotherapy on the Nutritional Status of Egyptian Patients with Breast Cancer", reported that Most of the patients had stage II disease.

Concerning treatment characteristics**,** this study showed that, the majority of the studied patients in both study and control groups received the third and fourth chemotherapy cycle. This result is in line with **(15)** who conducted " Depressive Symptoms among Cancer Patients Undergoing Chemotherapy", reported that From a total of 111 respondents in the study, majority of them were in the third cycle, while; near to half of the studied patients were in the forth cycle and above.

As well **,** this study showed that, the majority of the studied patients in both study and control groups received a combination of chemotherapy treatment, followed by taxol regimen. This result is in line with **(16)** who conducted "Assessment of Performance Status on Physical and Psychological Problems Related to Chemotherapy among Patients with Cancer**",** revealed that the majority of participants received Taxol, fluorouracil, cyclophosphamide & Cisplatin were the four most commonly prescribed drugs usually in one of a variety of combinations.

Part 3: pre-intervention Brief Fatigue Inventory, State-Trait Anxiety Inventory score

Concerning pre-intervention fatigue score, this study showed that, there is no statistically significant difference between the study and control groups as regards pre-intervention fatigue score with higher percentage of moderate, and severe levels of fatigue respectively were noted. This finding in line with **(17)** who conducted **"**Self-management associated with fatigue in patients with advanced cancer: A Prospective longitudinal study ", mentioned that the participants commenced with moderate to severe levels of fatigue at baseline assessment.

Concerning factors that aggravate fatigue level, this study showed that, there is statistically significant difference between the study and control groups as among study group the higher percentage of patients mention chemotherapy as a factor that aggravate the level of fatigue, versus same percentage for both chemotherapy and pain among control group. This finding is in accordance with **(18)** who conducted **"**Prevalence of fatigue among cancer patients receiving various anticancer therapies and its impact on quality of life: A cross-sectional study ", showed that patients receiving chemotherapy suffered from higher fatigue score as compared to other treatment modalities as well as most participants indicated that chemotherapy was the cause of their fatigue. This finding also in line with **(19)** who conducted "Factors affecting quality of life in cancer patients undergoing chemotherapy", reported that there was a significant relationship between the cancer type, pain intensity, and fatigue.

Regarding pre-intervention anxiety score, this study showed that, there is no statistically significant difference between study and control groups as regards anxiety score before practice back massage in study group which indicated proper matching between study and control groups. This finding agrees with **(20)** who conducted "The effect of massage-therapy on a anxiety in breast cancer patients undergoing chemotherapy", stated that there was no statistically significant difference was observed between the two groups before the massage-therapy.

Part 4: Post intervention Brief Fatigue Inventory and State-Trait Anxiety Inventory score.

Concerning post intervention fatigue score, this study showed that,

there is statistically significant difference improvement in fatigue level with higher percentage of mild degree among study group following back massage intervention with p-value <0.001. This finding agrees with **(21)** who conducted

"Integrating Oncology Massage Into Chemoinfusion Suites: A Program Evaluation", stated that Patients reported significant decreases in anxiety, nausea, pain, and fatigue after massage provided during chemoinfusion.

In this respect **(22)** who conducted " Effects of Slow-Stroke Back Massage on Symptom Cluster in Adult Patients With Acute Leukemia ", reported that the slow-stroke back massage (SSBM) intervention significantly reduced progressive pain, fatigue, and sleep disorders (symptom cluster) intensity over time.

Regarding post intervention anxiety score, this study showed that, there is statistically significant difference between study and control groups, with lower mean of anxiety score among study group was noted immediately and after 24 hours of back massage intervention with p-value <0.001, as well there is statistical significant increase in anxiety score among control group. This finding in line with **(23)** who conducted "Effect of Slow-Stroke Back Massage on Anxiety of Older Women With Breast Cancer Undergoing Chemotherapy", reported that, The average score of anxiety level reduced significantly from 40.97 before intervention to 30.47 after the intervention in the study group compared to the control group and this decrease was significant (P<0.001).

Part 5: Total Fatigue and Anxiety score.

Concerning total fatigue score before, immediately, and post 24 hours of back massage, this study showed that, there is no statistically significant difference between study and control groups as regards pre-intervention fatigue score, while, there is statistically significant difference between study and control groups as regards fatigue score assessment immediately and after 24 hours of back massage intervention with lower fatigue score among study group was noted. This finding supported with **(24**) who conducted " Effects of back massage on chemotherapy-related fatigue and anxiety: Supportive care and therapeutic touch in cancer nursing", pointed out that there is no statistically significant difference between the study and control groups as regards fatigue level before chemotherapy, whereas the level of fatigue in the study group decreased statistically significantly immediate after the massage provided during chemotherapy and on the next day after chemotherapy.

As regards total anxiety score before, immediate, and post 24 hours after chemotherapy session, this study illustrated that, there is no statistically significant difference between study and control groups as regards pre-intervention anxiety score, while, there is statistically significant difference between study and control groups as regards anxiety score immediate and after 24 hours with lower mean of anxiety score among study group was noted. This may explained as patients being anxious before chemotherapy session due to tiredness, expecting high level of fatigue after chemotherapy session and fear that doctors may recommend more chemotherapy cycles or other treatment modalities as radiotherapy.

This finding in line with **(25)** who conducted "The effect of hand and foot massage on pain and anxiety ", reported that there was no significant difference between the two groups regarding pain and anxiety intensity before the massage. However, immediately, 60 and 90 minutes after the intervention there were significant differences between the two groups with lowered pain and anxiety intensity in the study group.

6. CONCLUSION

Back massage given during chemotherapy is a safe, inexpensive, and a non -pharmacologic nursing intervention, effective technique to reduce state anxiety and acute fatigue suffered during chemotherapy process. Back massage can be recommended as a safe nursing intervention along with the medical treatment in cancer patients.

Recommendations for better patient's outcome:

- Assess all patients with cancer for the presence of fatigue and anxiety before, during and after cancer treatment.
- Apply back massage as a supportive care for patients undergoing chemotherapy along with routine care to decrease the level of fatigue and anxiety associated with such treatment.

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