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Original Article

Effect of Massage Therapy on Sleep Quality Among Elderly Women with Breast Cancer

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1.ABSTRACT

Background: Poor sleep quality considered a persistent problem that commonly reported by breast cancer women especially in older adults resulting in increased morbidity, reduced productivity, and poor quality of life. Massage therapy has a positive effect in improving sleep quality and promote relaxation that can be utilized as supportive care.**Aim**: Determine the effect of massage therapy on sleep quality among elderly women with breast cancer. **Research design:** A quasi experimental research design was utilized. **Method**: a purposive sample of 72 elderly breast cancer women (≥60 years) attending at radiation unite of the oncology and nuclear medicine department. The study sample were divided into two groups; the study group (n=32) who received twelve Swedish massage sessions, and the control group (n=35) who received only routine care. Pittsburg Sleep Quality Index was completed before and after massage intervention to evaluate sleep quality. **Results**: After 6 weeks of massage therapy, sleep quality scores improved significantly in the study group (P<0.001) compared to the control group. while within group comparison, there was a significant improvement in post intervention sleep scores compared to pre intervention sleep scores for study group at three time points (baseline, at week 3 and at week 6) (P<0.001), while did not differ in the control group. **Conclusion:** Massage therapy is effective approach in improving sleep quality in elderly women with breast cancer. **Recommendations**: Development and implementation of massage training program targeting elderly women with breast cancer to ensure high quality performance of massage sessions.

Keywords: Breast Cancer, Elderly Women, Massage Therapy, Sleep Quality.

2.Introduction:

Breast cancer is most common cancer type affecting the middle-aged and elderly women. In the USA, according to the surveillance, Epidemiology, and End Results Program, the estimated new cases of breast cancer in 2022 are 287,850 cases representing 15.0% of all new cancer cases, while estimated deaths are 43,25 cases accounting for 7.1% of all cancer death. Approximately 12.9 percent of women will be diagnosed with female breast cancer at some point during their lifetime. The median age at diagnosis is 63 years old making the breast cancer the disease of the elderly women especially those who aged 65–74 years old. **(National Cancer Institute, 2022)**.

In Egypt, according to the international Agency for Research on Cancer, the estimated number of new cases of breast cancer in 2020 are 22,038 cases accounting for 32.4% of all new cancer cases, while estimated deaths in both sexes are 9 ,148 cases accounting for 10.3 % of all cancer death **(GLOBOCAN, 2021).** As results of the increased number of aging population in US along with association of breast cancer with aging, number of elderly breast cancer patients and survivors experiencing the long-term side effects of treatment also increased.

Sleep disturbances is one of the most commonly reported symptoms experienced by up to 70% of breast cancer patients. For older adults, poor sleep quality has been associated with increased morbidity, reduced productivity, depression, and cognitive impairment as well as poor quality of life. The process of aging usually accompanied by cellular changes making elderly patients at higher risk for sleep problems. Additionally, presence of comorbidities also increases the prevalence of sleep disturbance. Compared to normal population, rate of prevalence doubles in cancer patients **(Pappas & Mine, 2022 &Fontes, Pereira, Costa, Gonçalves & Lunet, 2017).**

Sleep disturbances is defined as "interference of normal sleep either by symptoms or condition with corresponding poor sleep efficiency''. Several risk factors may be related to sleep disturbances including emotional distress, physical pain, discomfort, cancer treatments related side effects, and adverse drug reactions **(Narayanan et al., 2022)** Patients may describe their sleep problems as a disruption of their habitual sleep pattern, difficulty falling asleep, frequent awakening, or in ability to maintain longer night episode (**Jakobsen, Gjeilo, Hjermstad & Klepstad, 2022).**

Sleep disturbances has been associated with increased inflammatory process as well as negative impact on immune system functions. Improved sleep has a multiple benefit, it can alleviate emotional distress, decreases counter-regulatory and pro-inflammatory cytokines, and boosts cell-mediated immunity. Therefore, it has an important role in regulating key cancer biological processes **(Irwin, Olmstead, Carroll, 2016).**

The increased demand for non-pharmacological interventions adds weight to the potential of massage as a therapeutic resource that used as a supportive care in cancer patients. It has a variety of advantages of being a safe, in expensive, and easy to apply method that can be utilized by breast cancer patients without measurable side effects **(Bahceli, Arslan & Ilik, 2022).**

Massage therapy can be performed through different forms including stroking, kneading, applying friction, and physical manipulation of muscles and other connective tissues **(Greenlee et al., 2017).** The basic principle behind massage therapy is modulate the body functions through careful manipulation of body muscle to produce certain physiological effects on the musculoskeletal, nervous and vascular system **(Liu et al., 2015).** It has been found to accelerate tissue healing, improve blood circulation, decrease blood pressure, alleviate tension and promote sleep. therefore, this study aimed to determine the effect of massage therapy on sleep quality among elderly women with breast cancer.

2.1 Aim of the study

This study aimed to determine the effect of massage therapy on sleep quality among elderly women with breast cancer.

2.2 Research hypothesis:

Elderly women with breast cancer who receive massage therapy will significantly exhibit improvement of sleep quality than those who do not receive massage therapy.

3Method

3.1Study design: A quasi-experimental research design was utilized.

3.2Study setting: The study was conducted in the radiotherapy unit of the Oncology and Nuclear Medicine department at Main Mansoura University Hospital. Radiation sessions are received daily throughout the week except Thursday and Friday. The radiotherapy unit has a linear accelerator and a CT scan device with simulator.

3.3Study participants: A purposive sample included 72 elderly women with breast cancer attending the above mentioned setting were assigned to either study or control group, thirty-six (36) women for each group. The study group were subjected to massage therapy, while the control group received a routine care. During the implementation phase, seven women were excluded; four from the study group and one from the control group due to their absence of more than two consecutive massage sessions. Therefore, total study sample became 67 elderly women (32 in the study group, and 35 in the control group).

The inclusion criteria:

1. Aged 60 years and above.
2. Diagnosed with stage I-III breast cancer.
3. Undergoing radiotherapy as adjuvant treatment after surgery.
4. Having ability for communication
5. Willing to be enrolled in the study

The exclusion criteria:

1. Elderly women with metastasis breast cancer.
2. Elderly women diagnosed with a psychiatric or neurological disorder or

having debilitating chronic illness that hinder patient's autonomy.

3. Using certain medication as psychiatric drug, steroids and anticoagulant during the week before the study.
4. Participating in any other form of complementary and alternative medicine.
5. Existence of any edema, wound, purpura, and bleeding during the intervention.
6. Absence for more than two consecutive sessions of the massage therapy.

3.4Sample size calculation:

This research is extracted from the doctoral thesis, which aimed to assess fatigue and sleep quality as associated symptoms in cancer patients, and being the fatigue is the independent factor affecting sleep quality in elderly cancer patients **(Loh et al., 2018)** so, the sample calculation was based on mean fatigue score as follow:

The sample size was estimated through Clin Calc.com sample size calculator software, at 3% ∞ error (97.0% significance) and 10.0 β error (90.0% power of the study), assuming that the average decrease in fatigue score 5.49 ± 2.53 in group receiving massage therapy and it was 3.24 ± 2.57 in group not receiving massage therapy (**Kinkead et al., 2018**). The calculated sample size was 60 and added 20.0% for better quality of collected data, so the required sample size became 72 patients; 36 patients in each group.

3.5Tools of Data Collection:

Two tools were utilized for data collection

Tool I: Demographic and clinical data structured interview schedule: -

It was developed by the researcher, it divided into three parts: -

Part 1: Demographic characteristics of the elderly cancer patients such as age, marital status, level of education

Part 2: Medical history of the elderly cancer patients such as medical diseases and medication used.

Part 3: Disease related characteristics including cancer stage, duration of illness, duration and type of surgery.

Tool II: Pittsburgh Sleep Quality Index (PSQI): -

Pittsburgh sleep quality was developed by **Buysse, (1989)**. It is an effective instrument used to measure and evaluate sleep quality and its pattern among older adults. The scale consists of 19 items measuring seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction.

It can classify the studied elderly into two categories; good sleepers and poor sleepers. Andrykowski and Carpenter recommended that a cut-off score of >8 for global PSQI score (vs. 5 as recommended by tool developer) more appropriate to determine poor sleeper when used with cancer population **(Carpenter and Andrykowski, 1998)**. In scoring the PSQI, scores of seven domains are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The seven domains scores are summed for getting a global score (range 0 to 21). Higher scores represent worse sleep quality.

3.6Validity and reliability:

Content validity and feasibility of the study tools (I and II) were tested and revised by a jury of 6 members' experts in the related field of oncology medicine, gerontological nursing, and medical surgical nursing. Their modifications and comments were considered. The reliability of tool II (PSQI) was assured by means of Cronbach's coefficient alpha, it indicated that tool II has a reliability of 0.85

3.7Pilot study:

A pilot study was conducted on 10% of elderly women (7) with breast cancer from the radiotherapy unit to ensure the clarity and applicability of the study tools, and accordingly the necessary modifications was done. These patients were excluded from the main study. Based on the findings of pilot study, researcher found that suitable time for implementation of massage session and data

collection was after the radiation session while they need a time for rest.

3.8Ethical Considerations:

An ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing – Mansoura University. The participants were assured that their participation is voluntary and that they have the right to accept or refuse to participate in this study. Also, the privacy of the study subjects and confidentiality of the collected data were assured. The study subjects were informed that in case of withdrawal at any time point, there was no any negative affection on their treatment pass way

3.9Procedure of data collection:

To complete data collection, researcher (PI) needed a nine months' duration, started from September 2020 to May 2021. Data collected through three phases; preparation, implementation, and evaluation phase.

I-Preparation phase

- Before approaching data collection, the PI received a training course in massage therapy under supervision of specialized trainer in the field of therapeutic massage and physical therapy in order to be skilled in practical application.
- The researcher has benefited from the offered training courses of the American Massage Therapy Association and other validated websites that are available for students and researchers to nourish their knowledge and ensure high quality practice.
- After obtaining the official approval for conducting the study, the researcher used to meet the eligible women in the restroom where they waiting for radiation session and introduced herself to them.
- The researcher obtained informed consent from the elderly women after explanation the potential benefits and risks as well as study aims and procedures.
- Through face to face meeting, researcher interviewed the study participants individually before implementation of massage sessions to collect the baseline data using the study tools (I and II). Each interview lasted between 20 and 25 minutes. Telephone numbers of the studied elderly were recorded to ensure continuous communication.

II-Implementation phase

- Massage therapy was performed individually for the intervention group in the private room in the radiotherapy unit. The proposed massage therapy was adapted from **Listing M., et al (2009), Kinkead et al., (2018), Kashani F & Kashani P (٢٠١٤)** and conducted in 12 massage sessions for a period of 6 weeks.
- During this phase, the elderly women who assigned to intervention group received a 30-minute Swedish massage of back, spine, shoulder and neck twice a week.
- At the beginning of the first session of massage, the researcher used to give the guided booklet to the participants in the intervention group to be familiar and oriented with steps of procedure and maintain their cooperation.
- The researcher used to prepare the environment; the room should be quite and dim lighting maintain the patient's privacy by use of curtains.
- The researcher assisted the elderly woman to take off her clothes and assume prone position, pillows and towels were putted beneath the patient's head and legs to ensure her comfort.
- Using baby Jonson oil, the researcher rubs hands together to warm it and started to distribute the oil on the selected parts for massage to prevent the friction and promote comfort
- Swedish massage techniques were performed to the participant in the intervention group using long strokes and gliding motion massage technique with mild pressure (5 min) using two hands, one hand, and palm of the hands which encompassing superficial effleurage.

➢ Deep effleurage with relatively greater pressure (7 min), using edge of hand, arm.

- Petrissage technique (kneading of the muscle) lasting 8 minutes using the palm of both hands, one hand, and two hands.
- Using thumb and fingertips, apply penetrating pressure over the muscle to demonstrate friction technique (5 min), and ending with superficial effleurage massage (5 min).

- Massage was performed on the following body parts with certain directions as follows;
  - Massage started from lower back from the iliac crest muscle upward to the shoulders of the patient and neck and then came cascading down.
  - Spine massage through paravertebral circular motion with gentle pressure and alongside iliac crest then to the hip.
  - Massage was applied over the hip (gluteus maximum muscle) then sacral up to the shoulder and round the scapulae then alongside the neck.
- After neck was massaged, hands moved down to shoulder, lower back and ends with iliac crest.
- After massage session was completely performed, researcher used to assist the patient in wearing her clothes and assuming setting position.
- Before leaving the room, the researcher made the correct sign on session follow-up card attached to the patient's booklet as an evidence for session attendance.
- For control cases, they received only the routine hospital care and the researcher used to give them a copy of printed booklet after finishing the data collection. The researcher also offered them the possibility of applying therapeutic massage sessions for those who want after completion the data collection.

III-Evaluation phase

- In relation to the intervention group, the participants were evaluated at three-point time; baseline evaluation, after 3 weeks, and after 6 weeks of the intervention, while the participants in control group were evaluated at two-point time; baseline and after 6 weeks of intervention.
- Baseline evaluation was done at the preparatory phase before the implementation of massage sessions for both groups using the study tools I (demographic and clinical data questionnaire) and tool II (PSQI).
- At the end of the third week, and six week of massage sessions, participants in the intervention group were evaluated using study tool II (PSQI).
- Comparison between the pre and post results of one group was done for each of the intervention and control group separately.
- Comparison between the intervention and control group's findings was done before and after the implementation of proposed intervention.

3.10Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation, median. Graphs were done for data visualization through using SPSS and Microsoft excel programs. The comparisons were determined using Student's t test for two variables with continuous data and ANOVA test for more than two variables with continuous data. Chi-square test was used for comparison of variables wit categorical data. Correlation between variables was evaluated via Pearson's correlation coefficient (r). Statistical significance was set at $p<0.05$.

4Result

Table (1) illustrated the demographic characteristics of the study and control groups. The studied elderly women were young old with a mean age of 64.69 ± 3.06 years for the study group, and 64.91 ± 3.22 years for the control group. Illiteracy was prevailing which constituted 65.6% of the study group and 48.6% of the control group. The majority of

the study group (81.2%) were living in rural areas while 18.8% were living in urban.

Table 2 demonstrated the presence of other chronic diseases and medications taken in the study and control group. About two third of the studied elderly women have at least one chronic disease. Hypertension was more prevailing which represent 36% and 52% in the study and control group respectively. Analgesics were the mostly drugs taken by the study sample; 96.9% and 100% in the study and control group respectively.

Table 3 demonstrated the disease related characteristics of the study and control groups. More than half of the study and control groups; 62.5% and 65.7% respectively had stage II breast cancer. The modified radical mastectomy was more prevailing type among the study and control groups; 43.8% and 57.1% respectively. Regarding the number of radiation session, 50% of the study group and 45.7% of the control group reported that they received from six to ten radiation sessions.

Table 4 showed the component of sleep quality according to PSQI of the study and control groups before and after the implementation of massage therapy. The table reveals that the scores of all domains of sleep quality except use of medication were improved significantly (decreased) among the study group after 6 weeks of massage intervention ($P < 0.001$) compared to control group. No statistically significant differences between the study and the control groups before applying massage sessions, while the differences between both groups were statistically significant at 6 weeks after implementation of massage therapy for the six components ($P < 0.001$).

Figure 1 showed the mean score of six components of sleep quality among the study group before, after 3 weeks and after 6 weeks of implementation of massage therapy. The figures revealed that, the differences in all scores across the three periods were statistically significant ($P < 0.001$).

Table 5 showed the degree of improvement in sleep quality. Table revealed that the total and all components of sleep quality were improved significantly compared to the control group especially in sleep latency and sleep duration which decreased by -1.50 ± 0.51 and-1.41 ± 0.76 respectively in the study group while did not exceed -0.09 ± 1.04 and-0.17 ± 0.57 in the control group. the overall total score was also improved significantly in the study group while the change in the mean was -7.53 ± 2.16, while in the control group did not exceed -0.54± 3.30. The degrees of improvement were statistically significant between the study and the control group where p value found to be <0.001 in total and all sleep domains.

Table 6 illustrated the total mean score and level of sleep quality of the study and control groups before and after the implementation of massage therapy. The difference of sleep level among the study group was statistically significant ($P < 0.001$). No statistically significant difference found in the control group before and after the program. Moreover, the difference between the two groups before the program was not statistically significant while it was significantly after 6 weeks of massage sessions.

Table 1: Comparison between the study and control groups according to their demographic characteristics

Demographic characteristics	Study group (n = 32)		Control group (n = 35)		Test of Sig.	p-value
	N	%	N	%		
Age						
<65	14	43.8	19	54.3	χ^2= 0.742	0.389
≥65	18	56.2	16	45.7		
Min. – Max.	60.0 – 71.0		60.0 – 72.0		t= 0.295	0.769
Mean ± SD.	64.69 ± 3.06		64.91 ± 3.22			
Median	65.0		64.0			
Residence						

Rural	26	81.3	27	77.1	χ^2= 0.171	0.680
Urban	6	18.8	8	22.9		
Marital status						
Married	27	84.4	26	74.3	MC= 1.870	0.531
Widow	5	15.6	7	20.0		
Divorced	0	0.0	2	5.7		
Level of education						
Illiterate	21	65.6	17	48.6	MC= 4.192	0.369
Read and write	4	12.5	11	31.4		
Basic education	6	18.8	6	17.1		
University education	1	3.1	1	2.9		
Occupation before retirement						
Not working	25	78.1	28	80.0	χ^2= 0.036	0.850
Working	7	21.9	7	20.0		
Current job						
Not working	32	100.0	35	100.0	–	–
Income						
Enough	6	18.8	9	25.7	χ^2= 0.467	0.495
Not enough	26	81.3	26	74.3		
Living condition						
Alone	0	0.0	1	2.9	MC= 1.471	0.829
With the husband	8	25.0	10	28.6		
With family (husband and sibling)	18	56.3	16	45.7		
With one of the sibling	6	18.8	8	22.9		

SD: Standard deviation **t:** Student t-test χ^2: Chi square test **MC**:Monte Carlo

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

Table 2: Comparison between the study and control group according to their medical history

Items	Study group (n = 32)		Control group (n = 35)		Test of significance	p-value
	N	%	N	%		
Having other chronic disease						
No	7	21.9	10	28.6	χ^2 = 0.396	0.529
Yes	**25**	**78.1**	**25**	**71.4**		
Number of chronic disease						
1	15	60.0	13	52.0	MC	0.534
2	8	32.0	7	28.0		
3	2	8.0	5	20.0		
Mean ± SD	**1.48 ± 0.65**		**1.68 ± 0.80**		t=0.967	0.339
Types #						
•Hypertension	9	36.0	13	52.0	χ^2 = 1.299	0.254
•Diabetes	7	28.0	9	36.0	χ^2 = 0.368	0.544
•Cardiac diseases	8	32.0	9	36.0	χ^2 = 0.089	0.765
•GIT diseases	3	12.0	2	8.0	FET	1.000
•musculoskeletal system diseases	8	32.0	7	28.0	χ^2 = 0.095	0.758
•Respiratory system diseases	1	4.0	0	0.0	FET	1.000
•Renal diseases	0	0.0	2	8.0	FET	0.490
•others	1	4.0	0	0.0	FET	1.000

On regular medication						
Yes	32	100.0	35	100.0		
No. of medication						
1–2	7	21.9	11	31.4	χ^2 = 1.302	0.521
3	13	40.6	10	28.6		
4 and more	12	37.5	14	40.0		
Types #						
•Analgesics	31	96.9	35	100.0	FET	0.478
•Multivitamins	28	87.5	34	97.1	FET	0.185
•Antihypertensive drugs	9	28.1	11	31.4	χ^2 = 0.087	0.768
•Antidiabetic agents	7	21.9	9	25.7	χ^2 =.136	0.713
•Cardiac medication	8	25.0	7	20.0	χ^2 = 0.241	0.624
•Hepatic drugs	1	3.1	2	5.7	FET	1.000
•Renal drugs	0	0.0	2	5.7	FET	0.493
•Other(carbimazole)	1	3.1	0	0.0	FET	0.478

SD: Standard deviation **t:** Student t-test χ^2: Chi square test **MC:** Monte Carlo

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

Table 3: Comparison between the study and control group according to disease related characteristics

Items	Study group (n = 32)		Control group (n = 35)		Test of Sig.	p-value
	N	%	N	%		
Family history of breast cancer						
Yes	7	21.9	5	14.3	χ^2 =0.655	0.418
No	25	78.1	30	85.7		
If yes	(n = 7)		(n = 5)			
First degree	3	42.9	2	40.0	FET	1.000
Second degree	4	57.1	3	60.0		
Duration of breast cancer						
<6 Months	7	21.9	12	34.3	χ^2 =1.267	0.260
6 Months – 1 year	25	78.1	23	65.7		
>1 year	0	0.0	0	0.0		
Stage of disease						
Stage I	0	0.0	3	8.6	MC	0.272
Stage II	20	62.5	23	65.7		
Stage III	12	37.5	9	25.7		
Duration of breast surgery						
<6 Months	16	50.0	11	31.4	χ^2 =2.396	0.122
>6 Months	16	50.0	24	68.6		
Type of breast surgery						
•Total Mastectomy	10	31.3	3	8.6	χ^2=5.505	0.064
•Lumpectomy	8	25.0	12	34.3		
•Modified radical mastectomy	14	43.8	20	57.1		
Number of radiation session						
•5–6	2	6.3	7	20.0	MC	0.272
•6–10	16	50.0	16	45.7		
•11–15	14	43.8	12	34.3		
Min. – Max.	4.0 – 14.0		3.0 – 14.0		t=1.398	0.167
Mean ± SD.	9.84 ± 2.80		8.80 ± 3.27			
Median	9.50		9.0			

SD: Standard deviation **t:** Student t-test χ^2**:** Chi square test FET: Fisher Exact

p: p value for comparing between the studied groups

*: Statistically significant at $p \leq 0.05$

Table 4: Comparison between the study and control groups according to the components of sleep quality before and after implementation of massage therapy

Components of Pittsburgh Sleep Quality Index (PSQI)	Study (n = 32)			Control (n = 35)			Sig test U (p_1)	Sig test U (p_2)
	Before	After 6 weeks	Sig test Z(p_0)	Before	After 6 weeks	Sig test Z (p_0)		
Subjective sleep quality								
Min. – Max.	1.0 – 3.0	0.0 – 1.0	5.353* (<0.001*)	1.0 – 2.0	1.0 – 2.0	1.000 (0.317)	505.0 (0.300)	116.0* (<0.001*)
Mean ± SD.	1.97 ± 0.47	0.91 ± 0.30		1.86 ± 0.36	1.77 ± 0.43			
Median	2.0	1.0		2.0	2.0			
Sleep latency								
Min. – Max.	1.0 – 3.0	0.0 – 2.0	5.090* (<0.001*)	1.0 – 3.0	1.0 – 3.0	0.293 (0.770)	443.0 (0.068)	140.0* (<0.001*)
Mean ± SD.	2.19 ± 0.54	0.69 ± 0.54		1.94 ± 0.54	1.86 ± 0.73			
Median	2.0	1.0		2.0	2.0			
Sleep duration								
Min. – Max.	1.0 – 3.0	0.0 – 2.0	4.827* (<0.001*)	1.0 – 3.0	1.0 – 3.0	1.732 (0.083)	519.50 (0.527)	88.0* (<0.001*)
Mean ± SD.	2.16 ± 0.63	0.75 ± 0.57		2.09 ± 0.45	1.91 ± 0.45			
Median	2.0	1.0		2.0	2.00			
Habitual sleep efficiency								
Min. – Max.	0.0 – 3.0	0.0 – 1.0	4.768* (<0.001*)	1.0 – 3.0	1.0 – 3.0	1.155 (0.248)	530.50 (0.668)	59.50* (<0.001*)
Mean ± SD.	1.81 ± 0.86	0.53 ± 0.51		1.94 ± 0.54	1.83 ± 0.45			
Median	2.0	1.0		2.0	2.0			
Sleep disturbances								
Min. – Max.	1.0 – 3.0	0.0 – 1.0	4.919* (<0.001*)	1.0 – 3.0	1.0 – 3.0	0.121 (0.904)	519.50 (0.545)	101.50* (<0.001*)
Mean ± SD.	1.97 ± 0.65	0.91 ± 0.30		2.06 ± 0.54	2.03 ± 0.66			
Median	2.0	1.0		2.0	2.0			
Daytime dysfunctions								
Min. – Max.	2.0 – 3.0	0.0 – 2.0	4.949* (<0.001*)	2.0 – 3.0	2.0 – 3.0	0.00 (1.000)	455.500 (0.082)	11.500* (<0.001*)
Mean ± SD.	2.16 ± 0.37	0.97 ± 0.31		2.35 ± 0.48	2.34 ± 0.48			
Median	2.0	1.0		2.0	2.0			

SD: **Standard deviation** **U: Mann Whitney test** Z: **Wilcoxon signed ranks test** p_0: p value for comparing between the studied periods

p_1: p value for comparing between the studied groups before massage sessions

p_2: p value for comparing between the studied groups after 6 weeks

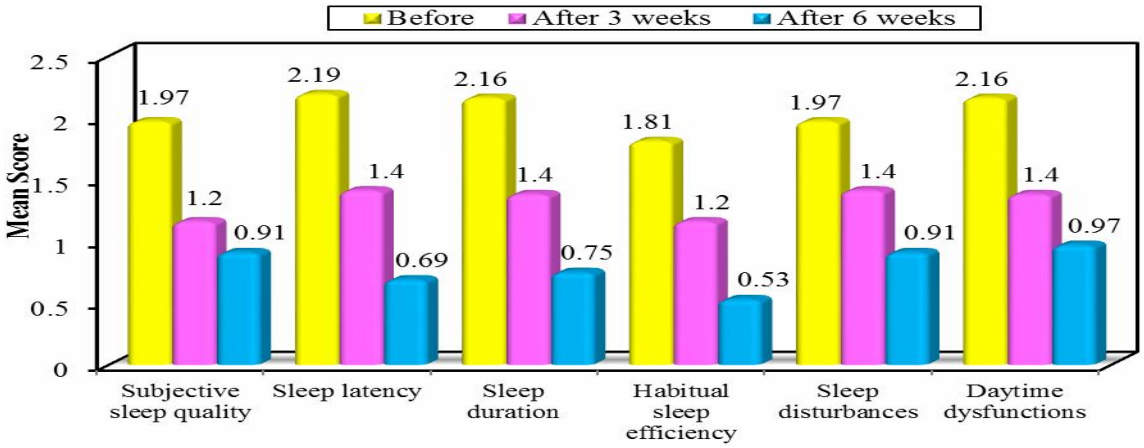

Figure (1): Mean score of sleep quality among the study group before, after 3 weeks and after 6 weeks of implementation of massage therapy

Table 5 : Comparison between the study and control group according to change in both total and component mean score (difference mean) of sleep

Total/componentsmean Difference score	Study group (n = 32)	Control group (n = 35)	Test of sig (U)	p-value
	M±SD	M±SD		
Subjective sleep quality	-1.06 ± 0.35	-0.09 ± 0.51	103.000*	<0.001*
Sleep latency	-1.50 ± 0.51	-0.09 ± 1.04	120.000*	<0.001*
Sleep duration	-1.41 ± 0.76	-0.17 ± 0.57	121.500*	<0.001*
Habitual sleep efficiency	-1.28 ± 0.68	-0.11 ± 0.58	138.000*	<0.001*
Sleep disturbances	-1.06 ± 0.56	-0.03 ± 0.92	210.000*	<0.001*
Daytime dysfunctions	-1.19 ± 0.40	0.01 ± 0.69	104.00*	<0.001*
Overall total score	**-7.53 ± 2.16**	-0.54± 3.30	17.00*	<0.001*

U: Mann Whitney test

p: p value for comparing between the studied **groups**

*: Statistically significant at $p \leq 0.05$

Table 6 : Total mean scores and level of sleep quality of the study and the control groups before and after the implementation of massage therapy

Sleep Quality (PSQI)	Study (n = 32)							Control (n = 35)						
	Before		After 3 weeks		After 6 weeks		Test of sig (p_0)	Before		After 6 weeks		Test of Sig. (p_0)	Test of Sig. (p_1)	Test of Sig. (p_2)
	N	%	N	%	N	%		N	%	N	%			
Overall Total score														
Normal	2	6.3	21	65.6	32	100.0	Fr=46.067 (<0.001*)	3	8.6	1	2.9	McN (0.500)	FET (p=1.000)	χ^2=63.113 (<0.001*)
Sleep disturbance>8	30	93.8	11	34.4	0	0.0		32	91.4	34	97.1			
Min. – Max.	6.0 – 17.0		4.0 – 12.0		2.0 – 7.0		Fr=63.512 (<0.001*)	7.0 – 15.0		8.0 – 15.0		Z=1.563 (0.118)	U=541.0 (0.809)	U=0.0* (<0.001*)
Mean ± SD.	12.31 ± 2.58		7.84 ± 1.74		4.78 ± 1.29			12.23 ± 2.06		11.74 ± 2.06				
Median	12.0		8.0		5.0			13.0		11.0				

SD: Standard deviation **χ^2:** Chi square test **U:** Mann Whitney test **Z**: Wilcoxon signed ranks test

Fr: Friedman test **McN:** McNemar test

p_0: p value for comparing between the studied periods

p_1: p value for comparing between the studied groups before massage sessions

p_2: p value for comparing between the studied groups after 6 weeks

*: Statistically significant at $p \leq 0.05$

5.Discussion

Breast cancer women experience a greater risk for sleep problems. Between 30% and 70% of breast cancer reported sleep disturbances at different time point starting from diagnosis even after treatment completion with increased prevalence in elderly women **(El Sayed, Dagher, & Mukherji, 2020).** The aim of the present study was to determine the effect of massage therapy on sleep quality among elderly women with breast cancer.

In the present study, sleep quality was evaluated by Pittsburg sleep quality index (PSQI), and effectiveness of massage sessions were assured by analysis derived from both within group comparisons and between group comparisons before and after massage intervention. Within group comparison, the sores of all components that measured sleep quality except use of medication were improved significantly in the study group after 6 weeks of massage intervention compared to pre intervention scores while the control group didn't show any differences.

Between group comparison, no statistically significant differences in sleep domains scores between the study and the control groups before applying massage sessions, while it was statistically significant for the six domains after 6 weeks of massage implementation. The improvement of sleep quality among the study group could be attributed to the integration of massage therapy into patient's care. Additionally, this finding supports the research hypothesis of this study which supposed that elderly women with breast cancer who receive massage therapy will report sleep quality improvement than those who do not receive massage therapy. The improvement of sleep quality among the study group could be attributed to the integration of massage therapy into patient's care.

Our findings are compatible with a study conducted in Iran by **Miladinia et al., (2017),** that applied a 30 min back massage three times a week for 4 weeks on cancer patients using PSQI for sleep monitoring. Thier results revealed that statistically significant differences between pre-post sleep scores in the study group compared to the control group. They also reported significant differences in sleep scores between study and control group after 4 weeks of intervention.

Additionally, **Jacobs et al., (2016)** reported in their study done in USA that intervention group who subjected to massage therapy experienced significant improvement in sleep scores especially for sleep duration (longer night time episode), and sleep efficiency compared to control group. Moreover, the result of systematic review by **Samuel et al., (2021),** concluded that massage therapy showed statistically improvement in sleep outcomes in massage group. Sleep component scores also evaluated in the study group at three-time point (before, at week 3, at week 6), and showed statistically significant differences which revealed significant improvement in sleep quality scores.

Similar results were reported by **Mohammed & Hassan**, **(2018),** who conducted a study in Egypt and reported that the 2nd and 4th week of aromatherapy massage in the study group showed a statistically significance difference in insomnia level. Our study findings are further supported by the results of systematic review done in Korea by **Kim, Jun, Hur, (2019),** which demonstrated that effect of massage on sleep was significantly greater than the inhalation method.

For further analysis, the degree of improvement in sleep scores was compared by calculation the change in means from baseline (before) to the end of week 6 in both groups. The results revealed that total and all 6 domains of sleep quality were improved significantly in the study group compared to the control group especially in sleep latency and sleep duration. The degrees of improvement were statistically significant between the study and the control group. This could be owing to the cumulative positive effect of massage sessions on sleep quality of women in the study group.

This findings are in consistent with a study carried out in Iran by **Kashani & Kashani , (2014)** who found that change in mean scores of sleep quality except use of hypnotics were statistically significant in the study group compared to the control group especially in sleep latency, sleep duration, sleep efficiency .

A comparison between the study and control group in relation to total mean score and level of sleep before and after massage interventions was done. The findings reveal that; majority of the study group were suffering from sleep disturbances at baseline. At week 3, the percentage of sleep disturbances was reduced to became one third, after 6 weeks of massage therapy, all of the study group were reporting a score less than 8 indicating they maintained normal sleep quality.

The difference of sleep level among the study group at three-time point was statistically significant, while in the control group still the same. Moreover, the difference between the two groups before the program was not statistically significant while it was significantly after 6 weeks of massage sessions. The improvement of total mean score and level of sleep could be related to the physiological effect of massage therapy such as improving blood circulation and decrease muscle tension and thus, providing sense of relaxation. The six domains of sleep quality have been improved leading to this significant improvement in total mean score and sleep level.

In the same line, the results of Cheraghbeigi**, Modarresi, Rezaei, & Khatony, (2019),** and **Pinar & Afsar (2016**), in Iran and Turkey revealed that total mean scores of sleep were improved significantly in intervention group after massage sessions compared to the control group.

In contrast to **park et al., (2016**) in south Korea**,** who studied the effect of aromatherapy massage on sleep quality on patients on hospice care which concluded that although there score of sleep improved but not enough to be statistically significant. This is may be attributed to limited time for massage session with short duration; only 5 minutes for five days. Another studies done by **choi, (2015)** in Korea and **Kawabata, Hata & Aoki, (2020)** in Japan contradict our finding and revealed that no statistically significant improvement in sleep outcomes after massage implementation.

6.Conclusion: -

The present study concluded that six weeks of Swedish massage therapy produced a statistically significant improvement in sleep quality scores across three time points, so, massage therapy is considered as an effective approach which can improve sleep quality in elderly women with breast cancer.

7.Recommendation:

- Development and implementation of massage training program targeting caregivers of elderly women with breast cancer to ensure high quality performance of massage sessions as a means of enhancing sleep quality.
- Counseling sessions should be applied to the elderly cancer women to integrate massage therapy to be a part of routine care supplied by guided booklets and brochures.

8.References

- Bahceli, P. Z., Arslan, S., & Ilik, Y. (2022). The effect of slow-stroke back massage on chemotherapy-related fatigue in women with breast cancer: An assessor blinded, parallel group, randomized control trial. Complementary Therapies in Clinical Practice, 46, 101518.
- Buysse, D.J., Reynolds III, C.F., Monk, T.H., Berman, S.R., & Kupfer, D.J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Journal of Psychiatric Research, 28(2), 193-213.
- Carpenter S, Andrykowski MA. Psychometric evaluation of the Pittsburgh Sleep Quality Index. J Psychosom Res 1998;45:5–13.
- Cheraghbeigi, N., Modarresi, M., Rezaei, M., & Khatony, A. (2019). Comparing the effects of massage and aromatherapy massage with lavender oil on sleep quality

of cardiac patients: a randomized controlled trial. Complementary Therapies in Clinical Practice, 35, 253-258.

- Choi, N. (2015). The effects of hand massage using aroma essential oil and music therapy on anxiety and sleeping for elderly women in the sanatorium. International Journal of bio-science and bio-technology, 7(5), 151-158.
- El Sayed, R., Dagher, C., & Mukherji, D. (2020). Sleep Disorders in Breast Cancer. In Sleep Disorders in Women (pp. 367-375). Humana, Cham.
- Fontes, F., Pereira, S., Costa, A. R., Gonçalves, M., & Lunet, N. (2017). The impact of breast cancer treatments on sleep quality 1 year after cancer diagnosis. Supportive Care in Cancer, 25(11), 3529-3536.
- Global Cancer Observatory :(Globocan)/ Fact sheet/ Population Fact Sheet /Egypt. 2021. Available at https://gco.iarc.fr/today/data/factsheets/populations/818-egypt-fact-sheets.pdf retrieved on September, 2022.
- Greenlee, H., DuPont□Reyes, M. J., Balneaves, L. G., Carlson, L. E., Cohen, M. R., Deng, G., ... & Tripathy, D. (2017). Clinical practice guidelines on the evidence□based use of integrative therapies during and after breast cancer treatment. CA: a cancer journal for clinicians, 67(3), 194-232.
- Irwin, M. R., Olmstead, R., & Carroll, J. E. (2016). Sleep disturbance, sleep duration, and inflammation: a systematic review and meta-analysis of cohort studies and experimental sleep deprivation. Biological psychiatry, 80(1), 40-52.
- Jakobsen, G., Gjeilo, K. H., Hjermstad, M. J., & Klepstad, P. (2022). An Update on Prevalence, Assessment, and Risk Factors for Sleep Disturbances in Patients with Advanced Cancer—Implications for Health Care Providers and Clinical Research. Cancers, 14(16), 3933.
- Kashani, F., & Kashani, P. (2014). The effect of massage therapy on the quality of sleep in breast cancer patients. Iranian Journal of Nursing and Midwifery Research, 19(2), 113-8.
- Kawabata, N., Hata, A., & Aoki, T. (2020). Effect of aromatherapy massage on quality of sleep in the palliative care ward: a randomized controlled trial. Journal of Pain and Symptom Management, 59(6), 1165-117
- Kim, M.-E., Jun, J. H., & Hur, M.-H. (2019). Effects of Aromatherapy on Sleep Quality: A Systematic Review and Meta-Analysis. Journal of Korean Academy of Nursing, 49(6), 655.
- Kinkead, B., Schettler, P. J., Larson, E. R., Carroll, D., Sharenko, M., Nettles, J., ... & Rapaport, M. H. (2018). Massage therapy decreases cancer□related fatigue: Results from a randomized early phase trial. Cancer, 124(3), 546-554.
- Listing, M., Reißhauer, A., Krohn, M., Voigt, B., Tjahono, G., Becker, J., ... & Rauchfuß, M. (2009). Massage therapy reduces physical discomfort and improves mood disturbances in women with breast cancer. Psycho□Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer, 18(12), 1290-1299.
- Liu, S. L., Qi, W., Li, H., Wang, Y. F., Yang, X. F., Li, Z. M., ... & Cong, D. Y. (2015). Recent advances in massage therapy--a review. Eur Rev Med Pharmacol Sci, 19(20), 3843-3849.
- Loh, K. P., Zittel, J., Kadambi, S., Pandya, C., Xu, H., Flannery, M., ... & Mohile, S. G. (2018). Elucidating the associations between sleep disturbance and depression, fatigue, and pain in older adults with cancer. Journal of Geriatric Oncology, 9(5), 464-468.
- Miladinia, M., Baraz, S., Shariati, A., & Malehi, A. S. (2017). Effects of slow-stroke back massage on symptom cluster in adult patients with acute leukemia: supportive care in cancer nursing. Cancer nursing, 40(1), 31-38.

- Mohammed, H. A., & Hassan, A. D. (2018). Impact of aromatherapy massage using lavender oil on fatigue and
- insomnia among patients with leukemia. IOSR Journal of Nursing and Health Science 7(4), PP 11-22.
- Narayanan, S., Reddy, A., Lopez, G., Liu, W., Ali, S., Bruera, E., ... & Yennurajalingam, S. (2022). Sleep disturbance in cancer patients referred to an ambulatory integrative oncology consultation. Supportive Care in Cancer, 30(3), 2417-2425.
- National Cancer Institute : Cancer statistics/Reports on Cancer/Cancer Stat fact /female breast cancer .2022 available at https://seer.cancer.gov/statfacts/html/breast .html; retrieved on September, 2022.
- Park, H., Chun, Y., & Kwak, S. (2016). The effects of aroma hand massage on fatigue and sleeping among hospice patients.
- Pappas, J. A., & Miner, B. (2022). Sleep Deficiency in the Elderly. Clinics in Chest Medicine, 43(2), 273-286.
- Pinar, R., & Afsar, F. (2016). Back massage to decrease state anxiety, cortisol level, blood prsessure, heart rate and increase sleep quality in family caregivers of patients with cancer: A randomised controlled trial. Asian pacific journal of cancer prevention, 16(18), 8127-8133.
- Samuel, S. R., Gururaj, R., Kumar, K. V., Vira, P., Saxena, P. U., & Keogh, J. W. L. (2021). Randomized control trial evidence for the benefits of massage and relaxation therapy on sleep in cancer survivors—a systematic review. Journal of Cancer Survivorship, 15(5), 799-810.