

Effect of Back Massage on Anxiety and Physiological Responses among Patients with Heart Failure

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Abstract: Heart failure is a life-threatening condition in which the heart can no longer pump enough blood to meet the metabolic needs of the body (American Heart Association, 2017). Heart failure has a broad-ranging impact, affecting almost every important aspect of patients' lives. Patients suffering from heart failure frequently feel physical suffering and anxiety. A massage provides both physical and emotional wellness. Aim of the study: to examine the effect of back massage on anxiety and physiologic responses in patients with heart failure. Setting: The study was carried out at the coronary care unit at Menoufia University Hospital. Sample: A convenient sample of 84 patients of both sexes with congestive heart failure. Design: A quasi experiment design (study/control) was utilized. Tools: A Semi Structured Demographic Questionnaire; State Anxiety Inventory Scale; New York Heart Association Classification of Heart Failure and Biophysiological Parameters Sheet were used to collect data. Results: There was a highly statistically significant decrease in the mean score of total anxiety and improvement in physiologic responses (systolic blood pressure, diastolic blood pressure, heart rate, respiratory rate and oxygen saturation) between study and control group post intervention, $P < .001$. Conclusion: After back massage for 3 consecutive days, the participants' systolic and diastolic blood pressure, heart rate, and respiratory rate were significantly lower than pre intervention, while their oxygen saturation levels significantly increased. Recommendation: Massage therapy should be used to balance the vital signs and reduce anxiety level of patients with heart failure admitted to the coronary care units.

Keywords: Anxiety, Back Massage, Congestive Heart Failure, Physiologic Responses, Coronary Care Unit.

1. INTRODUCTION

According to the American Heart Association of Heart Disease and Stroke Statistics Update (2017), 6.5 million Americans have Heart Failure (HF), a number that may increase to eight million by the year 2030 (Heart Disease and Stroke, 2017) [1]. Heart failure is a life-threatening condition in which the heart can no longer pump enough blood to meet the metabolic needs of the body (American Heart Association, 2017). Heart failure has a broad-ranging impact, affecting almost every important aspect of patients' lives. Consequently, psychological distress is prevalent in patients with HF and Quality of Life (QoL) is often markedly impaired. In addition, HF is often co-prevalent with symptoms of depression and anxiety and these symptoms have been found to worsen the course and prognosis of HF [2 & 3].

Anxiety is significantly associated with a higher occurrence of adverse cardiac events and cardiac death in the general population and in patients with coronary artery disease [4]. Anxiety also has been linked to pathophysiological mechanisms that could mediate negative outcomes such as reduced heart rate variability and baroreflex cardiac control, cardiac arrhythmias, and sudden death. Patients with HF have a 60% higher level of anxiety compared to healthy elders;

40% of heart failure patients suffer from major anxiety [5]. However, there are contradictory results about the association between anxiety and health outcomes in patients with HF [5]. Anxiety affecting the nervous system, endocrine glands and immune system causes dysrhythmias, myocardial ischemia, heart failure, delirium, and delay in recovery of injuries and infections. Moreover, it increases the length of hospital stay and pain intensity and decreases the quality of life and sleep and finally may lead to death [6 & 7].

There are many complimentary health approaches that can have a positive effect on anxiety; massage ranks the first among all measures which can be used to secure the comfort of the patient. A massage provides both physical and emotional wellness. Massage therapy has been shown to decrease cortisol levels in the body because it enables the body to enter a recovery mode. Moreover, massage triggers lasting feelings of relaxation, improved mood, and reduced stress levels [8].

Significance of the Study:

Back massage is a simple non-invasive, relaxing and natural technique that is considered a safe treatment for most people. There is evidence that massage can reduce pain, blood pressure, heart rate, cortisol, and promote sleep and immune function. Although the effect of massage on the treatment of various medical conditions have been examined in many studies, little is known about whether back massage can reduce anxiety and improve a physiologic response in patients with heart failure. Back massage is important for nurses because it covers one of the most important issues in nursing practice. It enables nurses to maintain normal physiological parameters, reducing anxiety levels and tension, promoting relaxation, improving nurse/patient communication and increasing the well-being of the patient. [9].

Aim of the Study:

The aim of the current study was to examine the effect of back massage on anxiety and physiologic responses in patients with heart failure.

Research Hypotheses:

- 1- Patients with HF who are receiving back massage are more likely to experience less anxiety levels than patients who are not receiving the back massage.
- 2- Patients with HF who are receiving back massage are more likely to have normal physiological responses than patients who are not receiving the back massage.
- 3- There is a relationship between selected demographic characteristic such as (age, gender, marital status and level of education) and anxiety level after the back massage.
- 4- There is a relationship between selected demographic characteristic such as (age, gender, marital status and level of education) and physiological responses such as (SBP, DBP, HR, RR, SaO₂) after the back massage.

2. METHODS

Design: A quasi experimental design (study/control) was utilized to examine the effect of back massage on anxiety and physiologic responses in patients with heart failure.

Setting: The study was carried out at the Coronary Care Unit (CCU), at Shebin El-Kom, Menoufia University Hospital, Menoufia Governorate, Egypt.

Sample: A convenient sample of 84 patients was recruited to participate in this study. These patients were approached over an 11 month period from the beginning of August 2017 to the end of June 2018. These patients met the following Inclusion Criteria: a) patients with confirmed diagnosis of heart failure by physicians and through NYHA classification of heart failure; b) adult patients (19-65 years); c) patients who were willing to participate in the study. Patients were excluded to participate in the study if they have any of the following conditions: a) back injuries, spine fractures, rib fractures and back pressure ulcer to avoid further injury; b) respiratory failure or cardiac tamponade to avoid stressing a weak heart; c) heart failure patients who are bedridden and psychologically unstable and NYHA (New York Heart Association) Grade IV to avoid stressing a weak heart as patient has symptoms at rest.

Sample Size Calculation: In the present study, sample size was calculated based on a power analysis performed in a previous study which indicated that 64 patients would yield sufficient statistical power of 80% to detect the effect of back massage on anxiety and physiologic responses in patients with heart failure, medium treatment effect size = 0.5, and alpha = 0.05 [10 & 11]. Twenty patients more were added to compensate the possible attrition rate (16%). [12].

Tools for Data Collection: Four tools were used to collect data.

I: A Semi-Structured Questionnaire: This tool was developed by the investigator to collect data related to two main aspects. The first was patient's socio-demographic data including patient's age, gender, educational level, occupation and marital status. The second was patient's clinical data covering diagnosis, duration of the disease and medication. Data was extracted from the patient's medical records by the investigator at the initial data collection point after admission to the Coronary Care Unit.

II: State Anxiety Inventory (SAI): Anxiety was measured using the Spielberger's State Anxiety Inventory (SAI) [13]. The SAI is a self-reported scale that consists of 20 statements that measure how respondents feel at the time of assessment. Half of the items were worded negatively and half were worded positively. The SAI scale evaluates feeling of apprehension, tension, nervousness, and worry. Subjects respond to the items on the scale by rating their responses on a four-point Likert-type scale, from 1 (not at all) to 4 (very much so). Total scores can range from 20 to 80. Higher scores indicate a higher level of anxiety. A cut off point of 39 – 40 has been suggested to detect clinically significant symptoms for the S-Anxiety scale [14].

The SAI has well-established reliability and validity. Alpha coefficients for the internal consistency of the SAI range from 0.86 to 0.95 and indicate excellent reliability [13]. The SAI also has well-established content, concurrent, and construct validity. In the present study, the reliability of the SAI was tested by test-retest reliability on 9 patients and the Cronbach's co-efficiency Alpha was 0.87.

III: New York Heart Association Classification of Heart Failure: Cardiac function status was measured using NYHA Classification [15]. The NYHA Classification measures the patient's perception of symptoms occurring during different levels of activity by assigning subjects to one of four cardiac functional classes (I – IV) based on subjects' responses to questions about the amount of fatigue, dyspnea or pain they experience at different levels of physical activity prior to the cardiac event. This classification reflects physical disabilities related specifically to the cardiac event. The instrument consists of four categories. Participants were asked to classify themselves in one of the four categories to reflect their cardiac functional status prior to the cardiac event. The categories reflect the ability to perform daily physical activities and the accompanying symptoms.

Class I: no limitation of physical activity. Ordinary activity does not cause undue fatigue, palpitation, or dyspnea.

Class II: slight, mild limitation of physical activity. Comfortable at rest but ordinary activity causes fatigue, palpitation, or dyspnea.

Class III: marked limitation of physical activity. Comfortable at rest but less than ordinary activity causes fatigue, palpitation, or dyspnea.

Class IV: unable to carry out any physical activity without discomfort and symptoms occur at rest.

Interrater reliability has been demonstrated to be 0.56 as measured by the percent of times that two observers agreed on the assessment of an individual patient [16]. Validity has been measured by comparing NYHA estimates with exercise treadmill performance. Of 150 estimates, 51% of the NYHA results agreed with treadmill performance [16]. Despite these low reliability and validity assessments, the New York Heart Association classification system is widely used as a clinically accepted instrument to categorize the degree of cardiovascular disability.

IV: Biophysiological Parameters Sheet: A Cardiorespiratory Parameters Questionnaire was developed by Holzheimer (2001) [17] to assess physiological parameters, such as: Heart Rate (HR), Respiratory Rate (RR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP), via the monitor (Nihon Kohden Life Scope Bsm-3500) which was calibrated automatically. Oxygen saturation (SaO₂) was measured by the pulse Oximerty.

The reliability of bed side monitor (NIHON KOHDEN, life scope, BSM 3000 series) was tested by Cronbach's Co-efficiency Alpha ($\alpha=0.87$). The validity of bed side monitor (NIHON KOHDEN, life scope, BSM 3000 series) had a Respiratory Rate accuracy of 93.1% and a Heart Rate accuracy of 94.4% among ICU patients. In the present study, the validity of the Cardiorespiratory Parameters Questionnaire was tested by using Pearson Product Moment Correlations. Based on the significant value obtained by the Sig (2-tailed) <0.05 and the internal consistency ($r^2=0.61$, $p\text{-value} = <0.05$). The reliability of the Cardiorespiratory Parameters Questionnaire was tested in the present study using the Internal consistency and the Cronbach Co-efficiency Alpha was 0.77.

Ethical Considerations:

All necessary official permissions for conducting the study were obtained from the Faculty of Nursing, Research and Ethics Committee as well as from the hospital directors. A verbal consent was obtained from the participants who met the study inclusion criteria. During the initial interview, the purpose and the procedure of the study were explained to the participants. It was also emphasized that refusal to participate or to withdraw from the study would not affect any aspect of the care provided to them. Confidentiality and anonymity of patients were assured through coding all data and putting all data collection sheets in a secured closed cabinet. The nature of the questionnaires did not cause any physical or emotional harm to the participants.

Pilot Study:

A pilot study was conducted on 10% of the study sample (nine patients) to test the practicality and applicability of the tools and to estimate the time needed to fill in the tools. Subjects participating in the pilot study were excluded from the final analysis.

Data Collection Procedure:

The participants were recruited to participate in the study on the third day of admission to the coronary care unit in order not to disturb the patients' medical treatment plan. The researcher collected data all days of the week from 1 p.m. to 4 p.m. Each participant (study and control group) was interviewed for three sessions, one session each day for three consecutive days. Each session took about one hour. The investigator gets the patients' list from the head nurse of the CCU to identify the potential participants.

Participants were interviewed individually by the investigator in the coronary care unit. Eighty-four adult patients were randomly assigned into two equal groups (study/control), 42 patients each. Both groups were matched against the study inclusion criteria as much as possible. The researcher handles the control group first to prevent contamination of data. The control group followed the usual hospital care. The study group received back massage intervention for 10 minutes once a day for three consecutive days beside routine hospital care.

Back Massage Intervention:

Back massage (from sacral area through to cervical area) was delivered 10 minutes each day for three days consecutively. Back massage intervention included pressing and stroking (effleurage), rubbing with short strokes, tapping (percussion), and rubbing with long strokes (friction) [7]. Back massage was scheduled one hour before meal or two hours after meal. Before the massage, each participant was asked to sit up and position himself/herself on a bedside table with a pillow to cushion. Curtains were drawn to ensure the participants' privacy and cover any parts of the body not being worked on.

A small amount of olive oil was applied before starting the massage with the whole hand using smooth rhythmic strokes. Using firm movements to stroke upwards, i.e., from the lower back right up to the neck, using gentle pressure circles around and slowly move to the lower back region for three minutes.

Using the heel of the hand, there is a smaller area of contact of which the pressure is deeper. Start at the lower back using both hands and work in circles. Using the same circular movement, move outward first and then upward. Return to the center gradually and then progress to the upper back for two minutes.

Use reinforced fingers to concentrate on a smaller area of contact. Stand on the right hand side of the area that you are working on. Place one hand on the top of the other hand and push with the flats of the hand away from the center line, and then glide back towards the spine. Begin this procedure at the lower back and work it up to the upper back for two minutes.

Using a reinforced thumb, use deep continuous pressure up to the full length of the muscles that are located at either side of the spine. As you move to the neck, lessen the pressure a little. Move slowly and intentionally, feeling for sensitive spots while you glide from the lower to the upper back. Continue this three times on each side, alternating it with a couple of effleurage and then repeat the stroking for one minute.

At the end of the massage session, apply effleurage with supported fingers, then effleurage with the heel of the hand, then full handed effleurage. Using these techniques will increase the impact that you have created with the trigger and stroking point release. Leave the patient quiet for a few minutes.

The technique of back massage has been explained in details with illustrated pictures in the designed manual and has been distributed at discharge time for family members. A training session for family members was conducted to make sure that they will continue the massage sessions at home. A phone number was given to the family member to answer any questions.

The investigator filled a semi-structure questionnaire (tool I) and New York Heart Association Classification of Heart Failure to assess the severity of the disease (tool III) from each participant individually before applying the massage intervention in the first session only for both study and control groups. The investigator filled the State Anxiety Inventory (tool II) and the Biophysiological Parameters sheet (tool IV) for both study and control groups pre-intervention and after the third day of the back massages intervention. The investigator waited for 30 minutes after performing the back massage and then assessed the anxiety level and the physiologic responses as (blood pressure, heart rate, respiratory rate, and blood oxygen saturation for both study and control groups).

3. RESULTS

Characteristics of the Sample

The mean age of the participants in the study and the control group was 52.38±4.8 and 52.62± 4.8 years old respectively. More than half of the participants in both study and control groups were male 52.4% and 54.8% respectively. Concerning the educational level, about 35.7% of both study and control groups can read and write. Half of the participants in the study and the control groups were working 50.0% and 54.8% respectively. The majority of the participants in both study and control groups were married 83.3% and 81.0% respectively. There was no statistically significant difference between the study and the control group regarding their sociodemographic characteristics. See table (1).

Table (1): The Sociodemographic Characteristics of the Sample (N=84).

| Items | Study Group n= (42) | | Control Group n= (42) | | χ^2 | P -value |
|--------------------------|------------------------|-------|--------------------------|-------|----------------------|----------|
| | No | % | No | % | | |
| Age | | | | | -.229- ^{ns} | .820 |
| Mean ± SD | 52.38±4.8 | | 52.62± 4.8 | | | |
| Range | 40 - 60 | | 40 - 60 | | | |
| Age Group | | | | | .814 ^{ns} | .436 |
| <50years | 14 | 33.3% | 12 | 29.3% | | |
| >50 years | 28 | 66.7% | 29 | 70.7% | | |
| Gender | | | | | .048 ^{ns} | .827 |
| Male | 22 | 52.4% | 23 | 54.8% | | |
| Female | 20 | 47.6% | 19 | 45.2% | | |
| Marital Status | | | | | .091 ^{ns} | .955 |
| Married | 35 | 83.3% | 34 | 81.0% | | |
| Widow | 6 | 14.3% | 7 | 16.7% | | |
| Divorced | 1 | 2.4% | 1 | 2.4% | | |
| Educational level | | | | | .000 ^{ns} | 1.000 |
| Illiterate | 11 | 26.2% | 11 | 26.2% | | |
| Read and Write | 15 | 35.7% | 15 | 35.7% | | |

| | | | | | | |
|---------------------|----|-------|----|-------|--------------------|------|
| Secondary education | 12 | 28.6% | 12 | 28.6% | | |
| High education | 4 | 9.5% | 4 | 9.5% | | |
| Occupation | | | | | | |
| Working | 21 | 50.0% | 23 | 54.8% | .827 ^{ns} | .414 |
| Not working | 21 | 50.0% | 19 | 45.2% | | |

NB: ns= not significant (p>0.05)

Table (2): The Effect of Back Massage on Anxiety Level among the Studied Groups Pre and Post Intervention.

| Items | Studied Groups N= (84) | | | | Mann-Whitney U test | p-value |
|---------------|------------------------|----------------|-----------------------|----------------|--|-----------|
| | Study Group n= (42) | | Control Group n= (42) | | | |
| | Pre Mean ± SD | Post Mean ± SD | Pre Mean ± SD | Post Mean ± SD | | |
| Total Anxiety | 54.35± 3.4 | 39.78 ± 3.3 | 54.26 ± 3.2 | 53.19 ± 3.2 | $\chi^2_1 = -.153$ - ^{ns} | P1=.87 |
| t-test | 27.591 ^(HS) | | .678 ^{ns} | | $\chi^2_1 = -18.929$ - ^(HS) | P2= <.001 |
| p-value | < .001 | | .091 | | | |

NB: ns= not significant (p>0.05) ^(s) = (p<0.05) ^(HS) = (p<0.001)

Table (2): Showed that there was a high statistically significant difference between the study and control group (39.78 ± 3.3) and (53.19 ± 3.2) respectively regarding the total anxiety level with P value < .001 post intervention. There was a high statistically significant difference post intervention comparing to (54.35 ± 3.4) in the study and the control groups (54.26 ± 3.2) pre intervention.

Figure (1): The Effect of Back Massage on Anxiety Level among the Studied Groups Pre and Post Intervention.

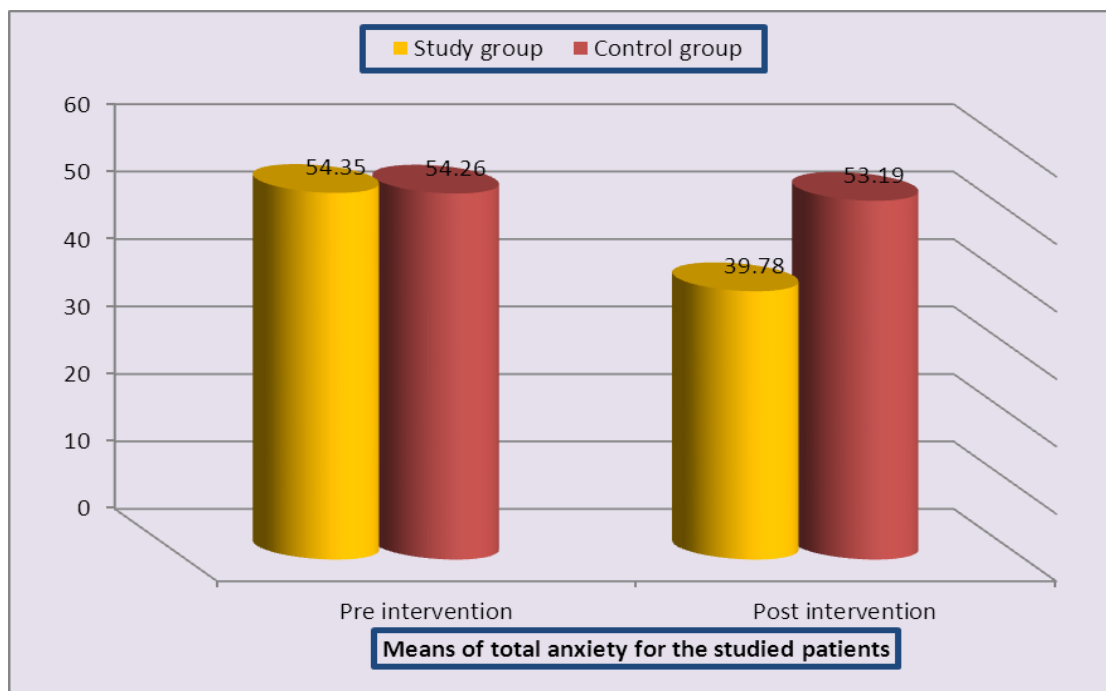


Figure (1)

This figure illustrated that there is a high statistically significant difference between the total anxiety level post intervention comparing to pre intervention among the studied groups.

Table (3): The Effect of Back Massage on Physiological Responses among the Studied Groups Pre and Post Intervention.

| Items | Studied Groups N= (84) | | | | Mann-Whitney U test P-value | |
|---------------------------------|-----------------------------------|-------------------|----------------------------------|-------------------|-----------------------------|-------------------------|
| | Study Group n= (42) | | Control Group n= (42) | | Pre | post |
| | Pre Mean ± SD | Post Mean ± SD | Pre Mean ± SD | Post Mean ± SD | | |
| Systolic Blood Pressure | 127.14 ± 8.05 | 103.09 ± 4.7 | 128.33 ± 7.6 | 118.33 ± 7.4 | -0.561 ^{ns} | -11.392 ^(HS) |
| Paired Test p-value | 21.218 ^(HS) < .001 | | -4.972 < .001 | | .575 | < .001 |
| Diastolic Blood Pressure | 86.78 ± 6.3 | 69.52 ± 2.9 | 87.14 ± 6.2 | 79.16 ± 7.8 | -1.669 ^{ns} | -7.514 ^(HS) |
| Paired Test p-value | 18.746 ^(HS) < .001 | | 4.680 ^(HS) < .001 | | .095 | < .001 |
| Heart Rate | 93.09 ± 8.7 | 77.83 ± 6.5 | 93.69 ± 6.6 | 85.52 ± 5.4 | -0.036 ^{ns} | -5.861 ^(HS) |
| Paired Test p-value | 19.253 ^(HS) < .001 | | 5.223 ^(HS) < .001 | | .971 | < .001 |
| Respiratory Rate | 25.12 ± 2.9 | 17.57 ± 1.03 | 25.24 ± 2.5 | 22.55 ± 1.5 | -0.125 ^{ns} | -17.926 ^(HS) |
| Paired Test p-value | 18.507 ^(HS) < .001 | | 4.641 ^(HS) < .001 | | .901 | < .001 |
| Oxygen Saturation | 84.43 ± 6.8 | 95.78 ± 2.1 | 84.14 ± 6.6 | 87.50 ± 4.7 | -0.149 ^{ns} | 10.159 ^(HS) |
| Paired Test p-value | -13.216 ^(HS) < .001 | | -3.589 ^(HS) < .001 | | .882 | < .001 |

NB: ns= not significant ($p > 0.05$) ^(s) = ($p < 0.05$) ^(HS) = ($p < 0.001$)

Table (3): indicated that there was a high statistically significant difference in the mean score of Systolic Blood Pressure (SBP) of both study and the control group (103.09 ± 4.7), (118.33 ± 7.4) respectively with p value <0 .001 post intervention. There was a high statistically significant difference post intervention comparing to (127.14 ± 8.05) in the study group and (128.33 ± 7.6) in the control group pre intervention.

Regarding the Diastolic Blood Pressure (DBP), there was a high statistically significant difference in the mean score of DBP of the study and the control group (69.52 ± 2.9), (79.16 ± 7.8) respectively with p value <0 .001 post intervention. There was a high statistically significant difference post intervention comparing to (86.78 ± 6.3) in the study group and (87.14 ± 6.2) in the control group pre intervention.

Regarding the Heart Rate (HR), there was a high statistically significant difference in the mean score of the HR of both study and the control group (77.83 ± 6.5), (85.52 ± 5.4) respectively with p value < 0.001 post intervention. There was a high statistically significant difference post intervention (93.09 ± 8.7) in the study group (93.69 ± 6.6) and in the control group comparing to pre intervention.

Regarding the Respiratory Rate (RR), there was a high statistically significant difference in the mean score of RR of the study and the control group (17.57 ± 1.03), (22.55 ± 1.5) respectively with p value < 0.001 post intervention. There was a high statistically significant difference post intervention (25.12 ± 2.9) in the study group (25.24 ± 2.5) and in the control group comparing to pre intervention.

Regarding the Oxygen Saturation, there was a high statistically significant difference in the mean score of oxygen saturation of the study and the control group (95.78 ± 2.1), (87.50 ± 4.7) respectively with p value < 0.001 post intervention. There was a high statistically significant difference post intervention (84.43 ± 6.8) in the study group and (84.14 ± 6.6) in the control group comparing to pre intervention.

This table shows that there was a highly statistically significant difference in the mean score of all physiological responses (SBP, DBP, HR, RR and SaO2) post intervention comparing to pre intervention among the studied group.

Figure (2): The Effect of Back Massage on Oxygen Saturation among the Studied Groups Post Intervention.

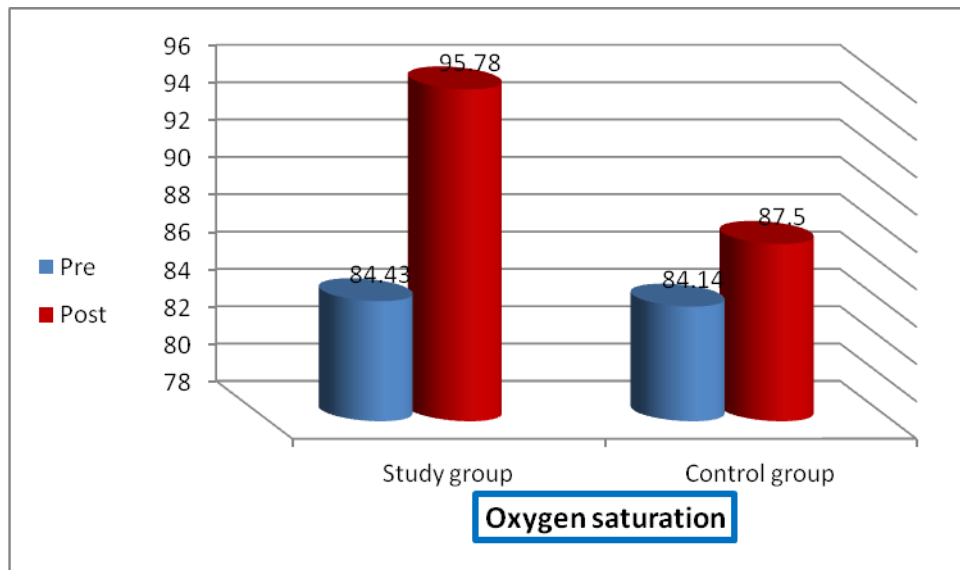


Figure (2)

This figure shows that there was a highly statistically significant difference in the mean score of oxygen saturation post intervention compared to pre intervention among the studied group.

Table (4): The Relationship between Total Anxiety Score and Demographic Characteristics among the Studied Groups Post Intervention.

| Variables | Total Anxiety scores | | | |
|-------------------|----------------------|---------|---------------|---------|
| | Study Group | | Control Group | |
| | r | P-value | r | P-value |
| Age | .041 | .797 | .104 | .511 |
| Marital Status | .288 | .065 | .158 | .317 |
| Occupation | .577** | .000 | .025 | .877 |
| Educational Level | .063 | .693 | .022 | .891 |
| Gender | .545** | .000 | .146 | .356 |

Table (4): Reveals that there was a relationship between total anxiety score and occupation and gender among the study group post intervention with r 0.577 and 0.545 respectively and p value 0.000.

Table (5): The Relationship between Total Anxiety Score and Physiological Parameters among the Studied Groups Post Intervention.

| Variables | Total anxiety scores | | | | | | | |
|--------------------------|----------------------|---------|--------|---------|---------------|---------|------|---------|
| | Study Group | | | | Control Group | | | |
| | Pre | | post | | Pre | | Post | |
| | r | P-value | r | P-value | r | P-value | r | P-value |
| Systolic Blood Pressure | .547** | .000 | .177 | .262 | .258 | .100 | .255 | .103 |
| Diastolic Blood Pressure | .291 | .062 | .524** | .000 | .158 | .318 | .051 | .750 |
| Heart Rate | .127 | .423 | .212 | .178 | .011 | .945 | .064 | .689 |
| Respiratory Rate | .106 | .506 | .184 | .244 | .188 | .232 | .070 | .661 |
| Oxygen Saturation | .112 | .482 | .003 | .984 | .088 | .581 | .158 | .317 |

Table (5): Showed that there was a relationship between total anxiety score and systolic blood pressure on pre intervention with r 0.547 and p value 0.000 and diastolic blood pressure on post intervention with r 0.524 and p value 0.000 among the study group. However, there was no relationship between the anxiety total score and HR, RR and oxygen saturation.

4. DISCUSSION

Negative emotional states adversely affect quality of life [18, 19, 20] adherences to recommended treatment [21, 22, 23] and physical outcomes in patients with heart failure [24, 25, 26, 27].

Effect of Back Massage on Anxiety:

The present study findings revealed that there was a highly statistically significant decrease in the total means score of anxiety in the study group post intervention compared with the control group. The finding of the current study is similar to what was reported by Rodrigues and Sams (2018) [28] who examined the effectiveness of foot and hand massage on pain, anxiety and selected physiological parameters in postoperative open heart surgery patients and found that there was a significant decrease in the total mean score of anxiety and decrease in respiratory rate and heart rate post intervention.

Also, similar findings were reported by Boitor, et al, (2018); Miozzo, et al (2016) [29& 30] who evaluated the effects of hand massage on the pain and anxiety post cardiac surgery and found that the study group who received the massage intervention reported significantly lower pain intensity and anxiety level than the control group who did not receive the massage intervention.

In addition, the effect of massage therapy on anxiety was examined in patients with heart failure by Ramezanli, et al (2016) [31]. The findings of the study were similar to the findings of the current study findings where a statistically significant decrease in the total mean score of anxiety was reported after massage.

However, the findings of the current study are different from what was reported by Zolfaghari, et al (2012) [32] who examined the effects of therapeutic touch on anxiety, vital signs, and cardiac dysrhythmia in a sample of Iranian women undergoing cardiac catheterization and found that therapeutic touch did not significantly affect the anxiety level. A possible explanation of the study findings may be attributed to the short-term of the intervention. Also, the findings of the current study were not consistent with Baxter and Albert (2011) [33] findings who concluded that massage therapy may be pleasant but was not effective on trait anxiety after heart surgery.

Effect of Back Massage on Physiological Responses:

The findings of the current study revealed that there was a highly statistically significant decrease in the mean scores of systolic blood pressure, diastolic blood pressure, heart rate, respiratory rate and increase the mean score of oxygen saturation of the study group post intervention compared with the control group. These findings are similar to what was reported by Givi et al., (2018) [34] who examined the long-term effect of massage therapy on blood pressure in pre hypertensive women and found that the mean systolic BP (SBP) and diastolic BP (DBP) in the massage group were significantly lower in comparison with the control group.

In addition, the present study findings are congruent to what was reported by Alimohammad, et al (2018) [35] who examined the effect of hand and foot massage on anxiety and vital signs in patients with acute coronary syndrome and found that after the intervention, the mean changes in the levels of anxiety, blood pressure, heart rate, and respiratory rate were significant. Similar findings have been reported by Khaledifar, et al (2017) [36] who studied the effect of massage therapy on vital signs and stress before coronary angiography and found that there was a statically significant reduction in heart rate, blood pressure, respiratory rate, an increase of the release of hormones (e.g., endorphins) and a decrease in stress level. These findings can be explained by the fact that massage may induce a sense of comfort and relaxation and endorphins may be secreted [37] to cause vessel dilatation, increased blood flow within the superficial vessels of the body [38] and reduced blood pressure. Another explanation of the reduction of heart rate may be related to the anxiolytic and Para sympathomimetic effects of massage [39 &40].

Also, similar findings were reported by Jamali, et al (2016) [41] who reported a significant decreased in systolic BP, diastolic BP, HR and respiratory rates after massage in patients with congestive heart failure. Also, the participants' oxygen saturation levels showed a significant improvement after massage. Likewise, findings of the present study are in agreement with Hatefi, et al (2015) [42] who examined the effect of whole body massage on the physiological outcomes

of trauma patients in ICU and found that there was a significant difference between experimental and control groups in SBP, DBP, RR, HR and O₂ saturation after intervention. These findings are supported with a meta-analysis report on massage therapy, which revealed that the patients' breathing frequency declined by 6.4% after the massages [43]. Moreover, these findings can be explained by what was reported by Field, (2002) [44] that massage can improve pulmonary function and promote circulation when the amount of blood in the pulmonary artery increases. The increased amount of blood has more chance to exchange gases, enabling more oxygen supply throughout the body and raising the oxygen saturation level.

However, the findings of the current study are different from what was reported by Jane, et al., (2009) [45] who did not find significant difference in the mean arterial pressure and HR in Taiwanese patients with metastatic bone pain after a full-body massage. A possible explanation of the study findings may be due to change the type of massage therapy.

The Relationship between Anxiety and Demographic Characteristic:

The findings of the present study revealed that there is a relationship between anxiety level and gender. The male participants showed a significant reduction in anxiety levels compared to the female participants in the study group post intervention. The study findings are similar to Chen et al., (2013) [7] who found that the male participants showed a significant reduction in anxiety levels compared to the female participants. In addition, the findings are consistent with the previous studies who reported that women expressed significantly greater levels of anxiety and depression than men did [46]. Also, it has been reported that female patients felt anxious and powerless regarding their illness [47].

In addition, the finding of the present study revealed that there is a relationship between the total mean score of anxiety level and occupation. Participants who were working had higher anxiety level than participants who do not work. Similar findings have been reported by Lee et al., (2015) [48] who studied the relationship between the anxiety symptoms and occupational stress among workers and found that anxiety and occupational stress were correlated.

However, the findings of the present study revealed that there is no relationship between the total mean score of anxiety and age, marital status and educational level post intervention. Similar findings have been reported by Chen et al., (2013) [7] who found that the total mean score of anxiety was not correlated to age, marital status and educational level. These findings are different from Moser, et al., (2010) [46] who found that patients' anxiety level was correlated with their age, and educational level. Also, this finding is not consistent with Jiang et al. (2004) [49] who interviewed 291 patients with CHF and found that the younger the patient, the greater the anxiety. In addition, Moser, et al., (2010) [46] found that the patients with an educational level of only high school or less reported a significantly higher levels of anxiety than those with a college education.

The Relationship Between Physiological Responses and Demographic Characteristic

The findings of the present study revealed that there was a relationship between mean scores of diastolic blood pressure and gender. The female participants showed a significant reduction in DBP compared to the male participants in the study group post intervention. Similar findings were reported by Emiloju, et al., (2017) [50] who examined the association between gender, age, body weight and hypertension in Nigeria and found that the females have lower blood pressure compared to males.

However, the findings of the current study are different from what was reported by Penuela (2015) [51] who examined the relationship between blood pressure, age, gender, body mass index and short term blood pressure variability in untreated hypertensive patients and found that the higher levels of Systolic and Diastolic blood pressure were found in females. Also, the study findings are different from Chen et al., (2013) [7] who reported that the mean scores of systolic and diastolic blood pressure were not correlated with gender in patients with congestive heart failure.

The findings of the present study revealed that there is no relationship between the mean scores of heart rate, respiratory rate and oxygen saturation in relation to their demographic characteristic in the study group post intervention.

Limitation of the study:

- The researcher performed the back massage and collected the data, so there is a risk of the experimenter effect.
- The findings of the current study are limited in their generalizability because of the convenience sample, small sample size and using a single setting for data collection.

5. CONCLUSIONS

Back massage can help patients with heart failure to be less anxious and more comfortable. After back massage for three consecutive days, the participants' systolic and diastolic BP, HR, and respiratory rates were significantly lower than before intervention, while their oxygen saturation levels significantly increased.

6. RECOMMENDATIONS

- The change in the vital signs is an important finding of this study because these changes would reduce the myocardial oxygen demand. Thus, it can be recommended that back massage be used to balance the vital signs of patients with heart failure admitted in CCU.
- Nursing currently emphasizes caring and humanity. In that light, the back massage protocol and the results of this study might be used to improve nursing education. It can be promoted in clinical practice, and carried out as part of nursing continuous education so as to enhance nursing quality and patient comfort.

Recommendations for Future Research

This study design needs to be expanded to a larger more heterogeneous population. This study did not analyze gender effects. However, comparing gender effects would be interesting particularly because there are studies reporting differences among gender.

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