

Effect of Massage Therapy on Physiologic Responses in Patients with Congestive Heart Failure

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Congestive heart failure (CHF) is the inability of the myocardium to pump enough blood to meet the body's metabolic demands. This study was conducted to assess the effects of effect of massage therapy on physiologic responses in patients with congestive heart failure. This study was a quasi-experimental, done with the permission of Jahrom University of Medical Sciences that conducted on two CCU wards of hospitals of Jahrom. Fifty participants were recruited to participate in this study within 24 hours after admission to the cardiac ward. The massages were begun 3 days after hospitalization in order not to disturb their medical treatment plan. Blood pressure, heart rate, respiratory rate, and blood oxygen saturation data were collected 30 minutes before and after back massage. A total of 50 individuals participated in this study. After 3 days of massage, participants' systolic BP ($p < 0.01$), diastolic BP ($p < 0.01$), HR ($p < 0.01$), and respiratory rates ($p < 0.01$) were significantly decreased. Also, the participants' oxygen saturation levels showed significant improvement ($p < 0.01$). Based on the findings of the present study, massage therapy was effective in blood pressure, heart rate, respiration rate and O₂ saturation in patients with CHF. Therefore we suggest that massage therapy be used as a complementary method to stabilize their vital signs.

Keyword: Massage Therapy, Physiologic Responses, Congestive Heart Failure, Patients

Congestive heart failure (CHF) is the inability of the myocardium to pump enough blood to meet the body's metabolic demands (AHA, 2011). The most common causes of CHF are hypertension and coronary artery disease (Schub *et al*, 2011).

CHF is characterized by several complex symptoms that are difficult to control and result in a high prevalence of re-hospitalization, morbidity,

and mortality across the world. Common physical symptoms of CHF are tachycardia, shortness of breath, decrease in arterial blood oxygenation (Pao₂), and discomfort (Davies *et al*, 2000).

Almost 50% of patients with CHF experience stress symptoms (Huffman *et al*, 2008). Patients with CHF feel uncertain, anxious, and depressed (Chen *et al*, 2010) Negative emotions (i.e., anxiety and depression) appear to be more common in patients with CHF than in healthy individuals (Moser, 2000). Elderly patients with heart failure had higher levels of anxiety than the healthy elderly. Moreover, it increases the length

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of hospital stay and decreases the quality of life (Moser *et al.*, 2010).

Different methods have been applied to reduce anxiety and its consequences. Therapeutic touch and massage are of the oldest anxiolytic methods (Sherman *et al.*, 2005). Massage is a systematic form of touch that manipulates soft tissues of the body to promote comfort and healing (Harris, 2010).

Back massage appeared to reduce diastolic BP, respiration, perceived psychological distress, and pain in the preparatory time for cardiac catheterization (McNamara *et al.*, 2003). However, a randomized clinical study demonstrated that 30-minute massage therapy sessions after cardiac surgery did not improve physical condition (e.g., heart rate and BP). (Albert *et al.*, 2009). While there have been multiple studies examining the effects of massage on the treatment of various medical conditions, there has been no research done to investigate whether massage improves physiologic response in patients with CHF in Iran.

Aim

The aims of this study were to investigate effect of massage therapy on physiologic responses in patients with congestive heart failure in Iran.

METHODS AND MATERIALS

Setting

This study was a quasi-experimental, done with the permission of Jahrom University of Medical Sciences that conducted on two CCU wards of hospitals of Jahrom. Subjects were recruited using convenience sampling.

Data collection

The data collection tool included two parts. The first part consisted of questions about demographic data. The second part was a sheet for recording the physiologic indicator (Blood pressure, heart rate, respiratory rate, and blood oxygen saturation).

Blood pressures were measured from the left arm, using a mercury sphygmomanometer, after resting for 15 minutes lying on back. The patients' heart rate and O₂ saturation were monitored on the patients' monitor. Respiration rate was also measured for one minute without patient's notice. During massage therapy, the patients' heart rhythm

was also being monitored.

Inclusion criteria

The criteria for inclusion: The participants were diagnosed with NYHA Class I–IV heart failure by a cardiac specialist, being literate, being conscious, and a long of stay more than 3 days, and willing to participate in the study.

Exclusion criteria

The participants with potential confounders, such as a thrombosis greater than 1 cm by the Doppler echography, back-pressure ulcers, acute pulmonary edema, respiratory failure, or cardiac tamponed, a cardiac arrest in the past 72 hours, severe dyspnea, a cardiac pacemaker, a pulse rate less than 60/min, a dialysis fistula and a history of bone fracture in the past 2 months and a history of receiving massage therapy were excluded.

Procedure

This study was approved by the Research Council and the Research Ethics Committee of Jahrom University of Medical Sciences. The researchers also obtained permission from the hospital authorities and an informed consent was obtained before data collection. The standard massage procedure was guided by an assistant professor of physical therapy.

Fifty participants were recruited to participate in this study within 24 hours after admission to the cardiac ward. The massages were begun 3 days after hospitalization in order not to disturb their medical treatment plan.

Protocols for massage varied in previous studies (Jane *et al.*, 2008). The intensity and duration of massage ranged from one session of 3–45 minutes to 15 sessions over 4 weeks (Jane *et al.*, 2009; Post-White *et al.*, 2003). To be consistent with the research aim to improve physical indicators, the protocol of massage for each participant in the intervention group, one session of massage therapy (for about 60 minutes) was done. For massage facilitation almond oil was used to massage back, shoulder deltoid muscles, front part of legs, arms, forearms, back of thighs, palms and fingers, metatarsus, front part of thighs, back of feet and toes, belly and chest, auxiliaries and neck muscles of the patient. Massage techniques used included static massage, surface tension techniques, stretching massage, superficial lymph unload, and transverse friction techniques (Shiri, 2010).

Massage has been done for 3 days consecutively. Massage was arranged one hour before a meal or two hours after a 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. Blood pressure, heart rate, respiratory rate, and blood oxygen saturation data were collected 30 minutes before and after back massage.

Data analysis

The massage effects on HR, respiratory rate, BP, and O2 saturation were examined across time with the paired t-test, separately, comparing each value of the post intervention measures with the value of pre-intervention measures. A repeated-measures analysis of variance was used to capture the effects of patterns on outcome measures.

RESULTS

A total of 50 individuals participated in this study. The proportion of male and female participants was 41.35. The mean age of the total cases was 69.13 (SD=11.82) years. Totally, 89.16% of the patients were married, 68.33% were employed and the others were retired or unemployed. The education of most of patients (58.33%) was at the level of primary school and the rest was at the level of secondary school or higher education. None of the patients had a history of massage therapy. With regard to the particular features of their conditions, the largest group (45.72) had been diagnosed with CHF less than 6 months earlier; most participants (70.31%) were NYHA class III (marked limitation of physical activity, only comfortable at rest). (Table 1).

Table 1. Demographic Data of Research Participants

Characteristic		Value
Mean age (years)		69.13 (SD=11.82)
Sex [% (women/men)]		41/35
Level of education	Elementary	58.33
	Secondary or higher	41.67
Marital status	Married	89.16
	Single or widowed	10.84
Employment	Employed	68.33
	Retired or Unemployed	31.67
CHF Diagnose	less than 6 months	45.72
	6 months or more	54.28
CHF classes	I	6.33
	II	23.36
	III	70.31

Table 2. Changes in Physiologic Indicators after Intervention (n= 50)

Time Variable	Pre intervention Mean ± SD	Day 1 Mean ± SD	Day 2 Mean ± SD	Day3 Mean ± SD	F ^a
Systolic BP (mm Hg)	136.35 (18.85)	129.53 (19.19)	126.23 (16.65)	123.85 (16.98)	18.82*
Diastolic BP (mm Hg)	81.95 (10.66)	77.72 (10.60)	75.26 (9.87)	72.81 (9.54)	13.25*
Heart rates (times/min)	95.12 (16.16)	91.04 (13.66)	87.98 (12.34)	85.16 (12.19)	25.18*
Respiration (times/min)	23.56 (4.18)	21.03 (3.48)	21.73 (3.52)	20.03 (3.05)	5.57*
Oxygen saturation (%)	93.62 (3.32)	93.99 (2.94)	94.74 (3.33)	95.76 (3.62)	41.92*

*p < 0.01

aF, F value analyzed by using repeated measures. SD, standard deviation; and BP, blood pressure.

As shown in Table 2, After 3 days of massage, participants' systolic BP ($p < 0.01$), diastolic BP ($p < 0.01$), HR ($p < 0.01$), and respiratory rates ($p < 0.01$) were significantly decreased. Also, the participants' oxygen saturation levels showed significant improvement ($p < 0.01$).

DISCUSSION

Results of the present study showed that massage therapy have beneficial effects on physiologic response of patients hospitalized in CCU by balancing systolic and diastolic blood pressures, heart rate and respiration rate. Some investigators found no significant effects of massage therapy on psychological responses (Cowen *et al.*, 2006; Combron *et al.*, 2006). However, findings of the present study are consistent with the studies conducted by Haji Hoseini *et al.*, (2006) and Shaban *et al.* (2004). This is consistent with the results Hernandez-Reif *et al.* 2000 In parallel with the results of systolic BP, the massage group also showed significant chronic reduction in diastolic BP after two, three and four days of massage therapy and acute significant reduction of 7mmHg after session 1 .

Massage may induce a sense of comfort and relaxation and then endorphins may be secreted (Tamparo *et al.*, 2011), vessels would be dilated, the blood flow increases within the superficial vessels of body (Eungpinichpong, 2008) and blood pressure will be reduced.

The recent study showed that the cardiopulmonary distress declined significantly after the first day of massage, and this happened again after the second and third days of massage.

In the literature review, it was found that of all the physiologic indicators of the effect of massage, HR was the strongest indicator of relaxation.

The reduction of heart rate after the massage may also be related to the anxiolytic and Para sympathomimetic effects of massage (Buttagat *et al.*, 2011; Lindgren *et al.*, 2010).

This is supported by Diego and Field who showed that the massage applied at medium pressure for 15minutes caused increase in the high-frequency component of HR variability which reflected an increase in vagal activities. In addition, there was a decrease in the ratio of low-frequency

component to high-frequency component of HR variability which indicates a change from sympathetic activities to parasympathetic activities (Diego, 2009).

Breathing rates also declined significantly. After the massages, respiratory rates showed significant decline on day 1 and day 3, but not on day 2. Further study would be needed to verify the relationship between changes in respiratory rate and frequency of massage.

Labyak and Metzger, after using met analysis on massage patients, found that the patients' breathing frequency declined by 6.4% after the massages (Labyak, 1997).

After participating in massage for 2 days, participants' blood oxygen saturation levels had significantly increased compared to pre-intervention in this study. Massage can also improve pulmonary function and promote circulation when the amount of blood in the pulmonary artery increases. The increased amount of blood has more opportunity to exchange gases, enabling more oxygen supply throughout the body and raising the oxygen saturation level (Field, 2002).

The observed alterations in the vital signs and can be important because these changes would reduce the myocardial oxygen demand. It can be recommended that massage therapy be used to balance the vital signs of patients admitted in CCU.

Overall, this study demonstrated the feasibility of implementing a back massage program, and the acceptability and perceptions of benefit in patients with CHF.

CONCLUSION

Based on the findings of the present study, massage therapy was effective in blood pressure, heart rate, respiration rate and O₂ saturation in patients with CHF. Therefore we suggest that massage therapy be used as a complementary method to stabilize their vital signs. However, further research can be suggested with daily repeating of massage therapy, evaluation vital signs at more times after the massage therapy sessions.

Ethical aspects

The study was approved by the institutional Ethics Committee of the University

Hospital, Jahrom, Iran. Prior to this study, patients were informed of the purpose of the research.

Participants were informed of their right

to refuse to participate in or to withdraw from the study at any stage. Anonymity and confidentiality of participants were maintained.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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