Original Article

# The Effect of Complementary Therapy for Hospital Nurses with High Stress

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## ABSTRACT

**Objective:** This study was to examine the effect of complementary therapy (CT) for nurses with high stress levels. It was taken before we employ this technique for cancer survivors because cancer patients are a heterogeneous group that requires substantial resources to investigate. **Methods:** A quasi-experimental design with five groups was employed for this study. The groups were examined whether there were effects for reducing the stress and the differences in effectiveness among four intervention groups and a nonintervention group. Stress relief was measured using pulse rate and blood pressure measurements and the short form of the profile of mood states (POMS-SF). The participants practiced the therapy for 20 min twice per week for 3 weeks. A two-way factorial analysis of variance was used to analyze the data. **Results:** The study enrolled 98 nurses (92 female and 6 male) with a mean age of 37.3 ± 10.5 years (range: 22–60 years). Fifty-nine nurses had 10 or more years of nursing experience. There were significant differences in pulse rate and the POMS-SF scores. All groups were effective for reducing the stress level of high-stress nurses, whereas four intervention CT groups were not more effective than nonintervention group. **Conclusions:** The complementary therapies were useful for nurses with high stress levels. Thus, they can be used as a self-management tool for such nurses. Afterward, we will use the CT for cancer survivors to determine whether it can improve the quality of life of cancer patients.

**Key words:** Complementary therapy, high-stress nurse, stress reduction

## Introduction

Complementary therapy (CT) is a part of complementary and alternative medicine (CAM) and can be a useful practice facilitated by nurses as part of a holistic care approach for maintaining a high quality of life (QoL)

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for patients.[1] This research aims to determine the effects of CT for cancer patients to help them maintain high QoL. However, we examined its psychological and physiological effects in nurses with high stress levels before we employed this technique to cancer survivors because cancer patients are a heterogeneous group that requires long study duration and substantial resources for investigation. Thus, this study refers to cancer survivors. Nurses working at hospitals experience physical and psychological stress because they frequently encounter stressful situations, such as advanced, complicated medical treatments, high number of elderly patients, and potentially fatal cases. Therefore, reducing stress is important for nurses to maintain their QoL and work performance.

The number of long-term cancer survivors in Japan increases with the advancements in medical treatments. Limited research has focused on educating patients beyond the treatment phase. Many patients are anxious about cancer recurrence, the uncertainty of death, and the side effects of cancer treatment, which lower their QoL.[2-5] On the other hand, 44.6% of cancer patients use CAM. Most patients use natural products, such as vitamins, minerals, traditional Chinese medicine, and probiotics. The second most frequently utilized CT techniques are mind and body practices and other body-based practices.[6] Thus, CT could be used to help cancer patients maintain their QoL.

The mind and body CT practices can be useful for nurses to offer as part of a holistic care approach. The oncology nursing researchers Lengacher *et al*. and Wyatt *et al*. have demonstrated the effectiveness of mindfulness-based stress reduction and reflexology. Interventions of Lengachers *et al*., which involve meditation, yoga, body scanning, and walking meditation, are effective for stress reduction and symptom management among 350 breast cancer survivors,[7] whereas Wyatt *et al*. found that reflexology improved physical functioning and reduced cancer-related symptoms among 451 patients.[8] Some articles written by oncology nurses described the importance and the effectiveness of CAM for cancer patients as cancer care.[9-12] Yokoi demonstrated[13] that acupressure, music therapy, aromatherapy, deep breathing, and massage, including lymphoid massage, were effective for Japanese patients with motor nerve dysfunction caused by chronic diseases and the final stage of cancer. Case studies presented in the study report of stress nursing[14] presented that progressive muscle relaxation (PMR), relaxation music therapy, exercise therapy, and aromatherapy effectively reduce stress and manage chronic symptoms. Moreover, some studies mentioned that bed rest is beneficial for those experiencing fatigue, which is related to QoL; some physicians recommended bed rest/relaxation for cancer-related fatigue.[15,16] However, psychological reaction to CT was readily revealed by measurement instruments, such as psychological scales, whereas a physiological reaction was not apparent. Thus, the psychological measures provided statistically significant evidence of the effectiveness of these CTs.[17,18] Thus, explaining CTs using physiological data is difficult. Long-term studies with large sample sizes are needed to determine the physiological effectiveness of CTs. Moreover, CT can be used in nursing practice because it does not have any detrimental side effects.

CT is a concept of stress reduction. Hence, CT is applied to relieve psychological distress, physical tension, and fatigue by stimulating the hypothalamus, cerebral cortex, and limbic system.[19] Pulse rate and blood pressure measurements and the short form of the profile of mood states (POMS-SF) questionnaire were used to assess the effectiveness of CT for stress reduction. The present study had methods such as relaxing music (RM), electrical heat stimuli (EHS), aroma foot bathing (AFB), and PMR by CT intervention groups for stress reduction because they were easy and harmless to use. Resting on Bed (RB) was used by control group to compare with CTs.

Thus, this study aims to examine the effects of CTs for high-stress nurses. The following research questions were explored:

- Are there differences in effectiveness before and after practicing CTs of RM, EHS, AFB, PMR, and RB for stress reduction?
- Are there differences in effectiveness between the four CTs of RM, EHS, AFB, and PMR as intervention groups and RB as control group?

Term explanation including the techniques and methods is as follows:

- RM: Participants listen to RM with earphones for 20 min on a bed
- EHS: Special EHS machine stimulates six meridian points (Chinese medicine term) on the arms and legs with 40–42°C. Participants apply six electrical stimulating buttons on the six points of arms and legs for 20 min on a bed
- AFB: Hot water with 40–42°C is prepared with a few

drops of participants' preferred aroma oil in a special foot bathing bucket. Participants put their feet into the bucket for 20 min on a bed
- PMR: Participants listen and practice the guided PMR exercise that is played on a compact disc on a bed for 20 min
- RB: Participants rest on a bed for 20 min.

# Methods

## Study design

A quasi-experimental design utilized four intervention CT groups, and one nonintervention group was employed for this study. RM, EHS, AFB, PMR, and RB were first examined whether they were effective for stress reduction. The four intervention CTs of RM, EHS, AFB, and PMR and nonintervention RB for the control group were employed to compare the reduction of the stress levels of high-stress nurses. The participants practiced for 20 min twice a week for 3 weeks, which is a total of six practice sessions. Pulse rate and blood pressure were used to determine the physiological effects, and the Japanese version of the POMS-SF was used to study the psychological effects. The measures were conducted before and after performing each practice for 20 min.

## Ethics

This study was approved by the Ethical Review Board of Mie University. The investigator explained the purpose and methods of this study to each participant and the participants provided written informed consent.

## Participants

The eligible participants were nurses with high stress levels caused by busy university hospital work. Nurses who had been taking some medication, such as a tranquilizer, a painkiller, a hypotensive drug, or a drug for mental disorder, and who could not join the study for 3 weeks continuously, were excluded. The study included 98 nurses working at a University Hospital in Central Japan. The study was conducted between September 2011 and July 2012.

## Procedure and setting

The 110 nurses were recruited through advertisements. The research investigators included four faculty members at the nursing school, Mie University, and one research assistant. On their first meeting, the study procedures were explained, and each nurse drew lots to select one of the four CTs and RB to practice. Twenty-two nurses were randomly assigned to each of the five groups: RM, EHS, AFB, PMR, and RB. The participants came to a room at the university after their hospital shift twice per week for 3 weeks to practice one of the interventions and nonintervention with the support of the investigators. Each participant practiced on the prepared bed for 20 min. Data points are in Table 1.

## Instruments

Pulse rate and blood pressure measurements and the POMS-SF subscales were used to examine the effects of RM, EHS, AFB, PMR, and RB. The POMS-SF has been translated into Japanese version[20,21] and is commonly used as a measure of psychological distress. This self-report instrument has achieved wide acceptance as a measure for assessing psychological distress in a variety of healthy and physically and mentally ill populations in Japan. The POMS-SF consists of 30 items grouped into six subscales, including tension–anxiety, depression–dejection, anger–hostility, vigor, fatigue, and confusion. The standardized scores for each item range from 20 to 85 using a 5-point Likert scale. The reliability of the POMS-SF and its subscales was estimated by Cronbach's alpha values, which range from 0.57 to 0.88 ($P < 0.01$) in a study by Yokoyama,[21] which indicates that POMS-SF has fairly high reliability. The internal consistency of the estimates for this study was quite high across all samples and subscales. Cronbach's alpha was 0.94 for the total mood disturbance score and ranged from 0.84 to 0.95 for each of the six subscales. Thus, the POMS-SF was reasonable to use for this study.

## Data collection and analysis

Each participant performed his or her practice for 20 min twice a week for 3 weeks. Pulse rate and blood pressure were measured by a research assistant, and the data of the POMS-SF were taken by nurses' self-recordings. The data were collected before and after each practice, which is a total of 12 data entries for each nurse.

A two-way factorial analysis of variance was used to compare pulse rate and blood pressure measurements and

**Table 1: Time table for data**

| Data points | Measuring instruments | W1 | | W2 | | W3 | |
|---|---|---|---|---|---|---|---|
| | | T1 | T2 | T3 | T4 | T5 | T6 |
| Before practicing | Pulse | × | × | × | × | × | × |
| | BP | × | × | × | × | × | × |
| | POMS-SF | × | × | × | × | × | × |
| After practicing | Pulse | × | × | × | × | × | × |
| | BP | × | × | × | × | × | × |
| | POMS-SF | × | × | × | × | × | × |

POMS-SF: Short Form of the Profile of Mood States. BP: Blood Pressure W1: Week1, W2: Week2, W3: Week3. T1: Time1, T2: Time2, T3: Time3, T4: Time4, T5: Time5, T6: Time6 x: Mark to be checked for mesuring

the POMS-SF subscales to determine whether differences are found between measurements taken before and after the practices in 6 time points. Moreover, a two-way factorial analysis of variance was used to compare the mean pre-post differences of the POMS-SF to investigate the differences in effectiveness among the four CTs and RB. A one-way factorial analysis of variance was used to test the baseline conditions of the participants in each group. The data were analyzed using IBM SPSS Statistics Desktop, Version 22.

# Results

## *Demographic data*

The demographic data of the subjects are shown in Table 2. A total of 12 out of 110 nurses enrolled in the study nurses withdrew their participation because they could not continue the practices after their hospital shifts for 3 weeks. Some of them were too ill to attend, some were too late to join the practice time, and some forgot to practice. The remaining 98 nurses consisted of 92 females and 6 males with a mean age of 37.2 ± 10.5 years (range 22–60). About 59 nurses had 10 or more years, 32 nurses had <5 years, and 10 nurses had 3–5 years of nursing experience [Table 2].

After participant drop-out, 19, 20, 20, 20, and 19 nurses practiced RM, EHS, AFB, PMR, and RB, respectively. Pulse rate and blood pressure measurements and the POMS-SF subscales before the practice were compared among five groups to consider the baseline conditions of the nurses in each group. No significant differences were found among them ($P$ = 0.213–0.899).

**Table 2: Sample Characteristics ($n$=98)**

| Characteristic | *n* (%) |
|---|---|
| Gender | |
| Male | 6 ( 6.1) |
| Female | 92 (93.9) |
| Age (years) | |
| 20-29 | 30 (30.6) |
| 30-39 | 29 (29.6) |
| 40-49 | 23 (23.4) |
| 50-59 | 15 (15.3) |
| >60 | 1( 1.1) |
| Years of nursing experience | |
| <1 | 12 (12.3) |
| >1-3 | 11 (11.2) |
| >3-5 | 10 (10.2) |
| >5-10 | 6( 6.1) |
| >10 | 59 (60.2) |

## *Effects of relaxing music, electrical heat stimuli, aroma foot bathing, progressive muscle relaxation, and resting on bed*

The effects of the five groups on pulse rate and blood pressure measurements and the POMS-SF subscales are shown in Tables 3 and 4. A significant difference was found in the participants' pulse rate before and after practicing each of the five groups in the main effect with practices ($P$ = 0.001–0.017). Significant differences in blood pressure before and after the practices were only seen for AFB ($P$ < 0.001 for systolic, $P$ = 0.036 for diastolic) in the main effect with practices, although the blood pressure measurements of other groups tended to be low after practicing [Table 3].

Significant differences were observed in all six POMS-SF subscales ($P$ = 0.001–0.008) except for vigor ($P$ = 0.297) of AFB in the main effect with practices when values were compared before and after the practice of each of the five groups. Moreover, significant differences were observed in some of the six POMS-SF subscales in the main effect with times and interaction [Table 4].

## *Relationships between four complementary therapies and resting on bed*

The changes in the six POMS-SF subscales after the practices in 6 time points are shown in Table 5. A significant difference in the POMS-SF subscales was not seen between the four CTs of RM, EHS, AFB, and PMR as intervention groups and RB as a control group in the main effect with practices, except for vigor ($P$ = 0.006) between AFB and RB. However, a trend of difference was identified in confusion ($P$ = 0.077) between AFB and RB in main effect with practices. Moreover, significant differences were found in some of the six POMS-SF subscales in the main effect with time.

# Discussion

## *Demographic characteristics*

The majority of nurses in this study are females (93.9%) and had 10 or more years of nursing experience (60.2%). The sample represents what is common in Japan. About 94.4% of all Japanese nurses are females.[22,23] Nurses at university hospitals tend to remain in hospitals and gain many years of experience in their career[24] like our study nurses having more than 10 years of experience. The nurses at the university hospital who participated in this study may be interested in practicing this type of therapy to reduce stress or for other reasons. Moreover, the baseline

**Table 3: Comparison between before and after the practice of each group at six time points in blood pressure and pulse ($n$=98)**

| Measuring instrument | 5 practice groups | | Before practicing in six time points | | | | | | After practicing in six time points | | | | | | Two way Factorical Analysis of Variance | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Main effect with practices | | Main effect with times | | Interaction | |
| | | | 1th | 2th | 3th | 4th | 5th | 6th | 1th | 2th | 3th | 4th | 5th | 6th | *F* | *P* | *F* | *P* | *F* | *P* |
| Blood Pressure (systolic) | RM ($n$=19) | Mean | 117.6 | 117.8 | 117.5 | 119.4 | 118.6 | 117.7 | 115.7 | 117.9 | 116.5 | 120.0 | 116.6 | 114.1 | 1.131 | 0.302 | 0.722 | 0.544 | 0.689 | 0.633 |
| | | ±sd | 13.50 | 17.30 | 12.54 | 17.34 | 17.57 | 16.07 | 12.21 | 18.71 | 14.87 | 15.49 | 16.82 | 14.87 | | | | | | |
| | EHS ($n$=20) | Mean | 114.2 | 112.3 | 116.0 | 114.0 | 113.1 | 116.1 | 116.8 | 114.6 | 112.1 | 108.8 | 118.0 | 113.6 | 0.007 | 0.785 | 0.966 | 0.443 | 3.525 | 0.006 |
| | | ±sd | 16.68 | 11.05 | 13.79 | 12.11 | 13.66 | 16.43 | 16.31 | 14.53 | 16.26 | 10.01 | 16.46 | 13.82 | | | | | | |
| | AFB ($n$=20) | Mean | 115.4 | 119.4 | 120.8 | 121.7 | 118.3 | 118.4 | 113.8 | 115.1 | 116.1 | 114.7 | 112.3 | 114.8 | 26.004 | <0.001 | 1.130 | 0.350 | 0.661 | 0.654 |
| | | ±sd | 12.57 | 13.95 | 16.88 | 15.53 | 16.27 | 12.78 | 12.39 | 13.32 | 16.37 | 14.29 | 10.66 | 12.31 | | | | | | |
| | PMR ($n$=20) | Mean | 118.3 | 115.6 | 118.6 | 118.1 | 120.5 | 113.6 | 118.9 | 113.5 | 115.5 | 119.1 | 117.1 | 114.8 | 0.741 | 0.401 | 1.770 | 0.127 | 0.755 | 0.585 |
| | | ±sd | 12.61 | 14.12 | 15.54 | 12.97 | 12.76 | 12.32 | 14.87 | 14.09 | 15.67 | 14.75 | 14.95 | 14.94 | | | | | | |
| | RB ($n$=19) | Mean | 117.3 | 113.4 | 114.7 | 112.9 | 115.7 | 114.6 | 114.1 | 112.3 | 112.9 | 110.2 | 114.2 | 111.6 | 4.270 | 0.053 | 1.127 | 0.347 | 0.165 | 0.975 |
| | | ±sd | 18.58 | 10.35 | 12.80 | 10.31 | 13.35 | 15.19 | 14.96 | 12.81 | 16.83 | 13.37 | 10.67 | 15.72 | | | | | | |
| Blood Pressure (diastolic) | RM ($n$=19) | Mean | 76.6 | 75.5 | 74.8 | 76.3 | 75.5 | 75.6 | 77.3 | 75.6 | 75.6 | 77.4 | 77.3 | 76.8 | 1.125 | 0.303 | 0.346 | 0.883 | 0.115 | 0.957 |
| | | ±sd | 9.15 | 9.52 | 9.56 | 10.92 | 10.99 | 11.17 | 9.20 | 9.43 | 12.50 | 12.80 | 9.75 | 11.25 | | | | | | |
| | EHS ($n$=20) | Mean | 73.0 | 72.7 | 72.4 | 71.6 | 73.7 | 74.4 | 75.2 | 73.6 | 70.9 | 74.9 | 75.5 | 73.5 | 2.104 | 0.163 | 0.759 | 0.581 | 0.794 | 0.489 |
| | | ±sd | 9.73 | 9.10 | 10.10 | 7.13 | 10.87 | 14.38 | 12.87 | 9.82 | 11.47 | 12.26 | 15.29 | 9.94 | | | | | | |
| | AFB ($n$=20) | Mean | 73.2 | 74.0 | 75.4 | 73.7 | 72.5 | 72.1 | 71.2 | 74.3 | 74.1 | 69.1 | 70.3 | 71.4 | 5.078 | 0.036 | 2.197 | 0.061 | 0.953 | 0.451 |
| | | ±sd | 7.94 | 8.15 | 8.35 | 7.62 | 8.08 | 6.71 | 7.19 | 7.50 | 9.99 | 8.83 | 9.95 | 8.49 | | | | | | |
| | PMR ($n$=20) | Mean | 76.7 | 74.8 | 74.5 | 74.4 | 76.8 | 73.7 | 75.5 | 75.6 | 74.4 | 76.9 | 75.7 | 75.1 | 0.172 | 0.683 | 0.429 | 0.827 | 0.622 | 0.607 |
| | | ±sd | 10.42 | 9.53 | 9.87 | 10.78 | 8.68 | 8.72 | 11.48 | 10.78 | 12.75 | 9.31 | 10.66 | 9.76 | | | | | | |
| | RB ($n$=19) | Mean | 72.8 | 72.5 | 71.8 | 71.8 | 72.6 | 70.1 | 74.0 | 73.9 | 72.4 | 71.8 | 71.7 | 71.3 | 0.335 | 0.570 | 0.781 | 0.566 | 0.283 | 0.921 |
| | | ±sd | 8.67 | 8.95 | 10.54 | 9.90 | 10.98 | 9.85 | 9.10 | 13.27 | 10.64 | 13.22 | 8.70 | 9.84 | | | | | | |
| Pulse | RM ($n$=19) | Mean | 72.9 | 76.1 | 76.8 | 76.5 | 75.8 | 73.4 | 68.6 | 72.2 | 71.2 | 71.7 | 72.9 | 69.9 | 36.335 | <0.001 | 1.404 | 0.231 | 0.437 | 0.821 |
| | | ±sd | 10.40 | 10.39 | 11.78 | 11.00 | 7.29 | 9.92 | 8.32 | 9.30 | 11.13 | 10.23 | 7.12 | 9.79 | | | | | | |
| | EHS ($n$=20) | Mean | 74.0 | 73.5 | 73.4 | 74.7 | 74.3 | 74.4 | 67.3 | 68.6 | 68.7 | 72.8 | 67.1 | 71.7 | 33.365 | <0.001 | 1.388 | 0.251 | 1.442 | 0.238 |
| | | ±sd | 8.60 | 8.68 | 8.12 | 8.37 | 11.70 | 8.98 | 6.76 | 8.17 | 8.18 | 7.99 | 7.38 | 8.89 | | | | | | |
| | AFB ($n$=20) | Mean | 71.1 | 70.6 | 78.1 | 74.6 | 76.6 | 69.1 | 67.4 | 68.6 | 72.4 | 69.4 | 73.7 | 71.8 | 6.809 | 0.017 | 2.615 | 0.051 | 3.124 | 0.012 |
| | | ±sd | 11.09 | 11.26 | 14.28 | 11.38 | 13.16 | 10.07 | 5.74 | 9.81 | 10.37 | 8.26 | 8.43 | 7.09 | | | | | | |
| | PMR ($n$=20) | Mean | 76.0 | 76.4 | 71.8 | 73.8 | 75.6 | 77.1 | 69.4 | 72.9 | 70.3 | 71.3 | 72.3 | 74.6 | 19.432 | <0.001 | 2.296 | 0.054 | 1.251 | 0.292 |
| | | ±sd | 10.93 | 13.55 | 9.45 | 9.56 | 10.71 | 7.96 | 9.11 | 11.86 | 9.19 | 7.86 | 8.14 | 10.37 | | | | | | |
| | RB ($n$=19) | Mean | 72.1 | 69.9 | 71.5 | 73.3 | 72.1 | 70.8 | 69.5 | 69.6 | 69.2 | 68.1 | 70.8 | 66.7 | 9.148 | 0.007 | 0.662 | 0.653 | 1.521 | 0.191 |
| | | ±sd | 11.95 | 7.90 | 10.07 | 10.92 | 10.58 | 11.88 | 9.32 | 9.03 | 9.33 | 8.87 | 9.37 | 8.63 | | | | | | |

RM: Relaxing Music, EHS: Electric Heat Stimuli, AFB: Aromatherapy Foot Bathing, PMR: Progressive Muscle Pelaxation, RB: Resting on Bed

conditions of the nurses in each group were almost the same to participate in the study.

### *Effects of relaxing music, electrical heat stimuli, aroma foot bathing, progressive muscle relaxation, and resting on bed*

Before and after the 20 min practice for RM, EHS, AFB, PMR, and RB, the significant differences in pulse rate and the POMS-SF subscales in 6 time points indicated that the four CTs and RB were effective for decreasing pulse rate and reducing tension–anxiety, depression–dejection, anger–hostility, fatigue, and confusion, as well as vigor excluding AFB. The significant difference in blood pressure showed that only AFB was effective for lowering both systolic and diastolic blood pressures. However, four CTs tended to have low blood pressures after practice. Therefore, AFB affects both physiological and psychological relaxation. Moreover, AFB did not decrease vigor significantly. Vigor is an inverse concept, which means that a high score is beneficial. However, the decrease in vigor after practice may reflect a state of deep relaxation brought about by the practice. The nurses were tired from the hard physical work performed during their hospital shift. Thus, AFB may minimally calm down vigor and keep it moderate and not falling into deep relaxation. Thus, AFB may be most effective for the nurses to relieve themselves after stressful work. All four CTs and RB were effective for stress reduction.

The results are consistent with the following studies. Miki found that the stress levels of 19 third year nursing students who practiced PMR for 3 weeks were effectively reduced; the effectiveness of PMR was measured using the POMS-SF.[25] The present study showed that the six subscales' scores of POMS-SF decreased after practicing PMR. The Complementary and Alternative Medicine

**Table 4: Comparison between before and after the practice of each group at six time points in the six subscales of POMS-SF (*n*=98)**

| Instrument (Subscales of POMS-SF) | 5 practice groups | | Before practicing in six time points | | | | | | After practicing in six time points | | | | | | Two way Factorical Analysis of Variance | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Main effect with practices | | Main effect with times | | Interaction | |
| | | | 1th | 2th | 3th | 4th | 5th | 6th | 1th | 2th | 3th | 4th | 5th | 6th | *F* | *P* | *F* | *P* | *F* | *P* |
| TA | RM (*n*=19) | Mean | 50.1 | 46.2 | 45.9 | 43.7 | 44.7 | 43.2 | 39.4 | 40.4 | 38.8 | 38.1 | 39.9 | 39.3 | 28.559 | <0.001 | 3.486 | 0.006 | 5.283 | 0.004 |
| | | ±sd | 8.29 | 7.56 | 7.23 | 7.40 | 7.75 | 6.50 | 5.88 | 6.40 | 5.32 | 5.45 | 6.94 | 5.73 | | | | | | |
| | EHS (*n*=20) | Mean | 52.4 | 47.4 | 49.0 | 46.1 | 46.1 | 46.4 | 41.7 | 38.7 | 38.5 | 38.3 | 38.3 | 38.6 | 21.659 | <0.001 | 3.275 | 0.043 | 2.151 | 0.094 |
| | | ±sd | 11.37 | 10.96 | 11.44 | 11.36 | 11.36 | 11.77 | 10.93 | 7.25 | 5.82 | 5.39 | 5.39 | 6.17 | | | | | | |
| | AFB (*n*=20) | Mean | 55.0 | 51.1 | 51.6 | 47.1 | 47.6 | 47.7 | 44.3 | 42.6 | 41.4 | 41.2 | 40.4 | 39.4 | 17.966 | <0.001 | 5.168 | 0.003 | 2.138 | 0.067 |
| | | ±sd | 14.02 | 12.24 | 12.61 | 12.68 | 11.28 | 12.50 | 9.16 | 7.32 | 5.90 | 7.26 | 4.78 | 4.73 | | | | | | |
| | PMR (*n*=20) | Mean | 53.1 | 47.2 | 49.5 | 47.3 | 46.4 | 48.0 | 40.8 | 39.0 | 40.2 | 38.0 | 38.8 | 39.7 | 26.901 | <0.001 | 2.854 | 0.019 | 1.460 | 0.236 |
| | | ±sd | 12.17 | 14.21 | 13.20 | 11.21 | 11.74 | 13.23 | 8.87 | 9.37 | 8.79 | 6.98 | 7.27 | 9.87 | | | | | | |
| | RB (*n*=19) | Mean | 50.8 | 45.4 | 46.2 | 47.3 | 47.7 | 49.5 | 42.9 | 40.4 | 40.5 | 40.3 | 42.4 | 42.4 | 22.713 | <0.001 | 1.436 | 0.219 | 0.770 | 0.574 |
| | | ±sd | 10.58 | 13.23 | 9.56 | 11.49 | 13.03 | 14.83 | 10.17 | 10.26 | 10.28 | 10.65 | 11.94 | 13.47 | | | | | | |
| D | RM (*n*=19) | Mean | 47.1 | 47.6 | 47.1 | 45.9 | 44.9 | 44.1 | 42.7 | 44.8 | 43.5 | 43.1 | 43.9 | 42.6 | 12.605 | 0.002 | 1.922 | 0.132 | 1.967 | 0.128 |
| | | ±sd | 5.66 | 7.40 | 6.90 | 7.34 | 6.68 | 5.58 | 5.23 | 7.28 | 6.50 | 5.52 | 6.84 | 6.24 | | | | | | |
| | EHS (*n*=20) | Mean | 49.7 | 48.3 | 47.0 | 46.0 | 46.0 | 45.2 | 42.8 | 42.6 | 42.6 | 41.8 | 41.8 | 41.6 | 27.844 | <0.001 | 2.094 | 0.108 | 1.024 | 0.191 |
| | | ±sd | 6.83 | 10.12 | 8.83 | 8.31 | 8.31 | 6.60 | 6.00 | 6.79 | 5.61 | 4.69 | 4.69 | 4.31 | | | | | | |
| | AFB (*n*=20) | Mean | 52.0 | 48.1 | 48.2 | 46.6 | 47.9 | 46.1 | 46.0 | 44.0 | 43.9 | 42.8 | 43.1 | 42.6 | 15.238 | 0.001 | 3.173 | 0.037 | 0.842 | 0.523 |
| | | ±sd | 10.73 | 9.02 | 8.76 | 8.68 | 8.81 | 6.98 | 7.43 | 5.65 | 6.23 | 4.53 | 4.08 | 4.60 | | | | | | |
| | PMR (*n*=20) | Mean | 49.6 | 47.0 | 47.6 | 47.2 | 46.1 | 45.3 | 41.6 | 41.6 | 42.2 | 42.2 | 42.4 | 43.1 | 8.863 | 0.008 | 0.411 | 0.743 | 2.769 | 0.022 |
| | | ±sd | 8.63 | 12.83 | 9.63 | 12.49 | 9.15 | 8.07 | 3.25 | 7.59 | 6.85 | 8.06 | 6.41 | 10.23 | | | | | | |
| | RB (*n*=19) | Mean | 49.8 | 47.7 | 47.2 | 47.5 | 50.0 | 50.9 | 45.3 | 44.4 | 43.1 | 43.1 | 45.2 | 47.8 | 20.842 | <0.001 | 1.029 | 0.003 | 0.437 | 0.746 |
| | | ±sd | 8.59 | 15.74 | 10.35 | 10.21 | 11.75 | 14.94 | 8.32 | 11.77 | 8.93 | 9.49 | 11.84 | 14.37 | | | | | | |
| AH | RM (*n*=19) | Mean | 46.6 | 45.1 | 46.2 | 43.1 | 43.1 | 43.0 | 40.1 | 40.7 | 41.8 | 39.3 | 40.4 | 39.4 | 13.620 | 0.002 | 1.915 | 0.100 | 1.713 | 0.167 |
| | | ±sd | 7.60 | 7.42 | 9.62 | 6.77 | 7.80 | 7.00 | 8.15 | 5.85 | 9.48 | 4.29 | 8.02 | 7.10 | | | | | | |
| | EHS (*n*=20) | Mean | 45.2 | 43.9 | 42.4 | 42.7 | 42.7 | 42.6 | 38.1 | 38.7 | 38.7 | 38.0 | 38.0 | 38.2 | 22.697 | <0.001 | 0.739 | 0.487 | 1.741 | 0.181 |
| | | ±sd | 6.34 | 6.63 | 4.56 | 5.98 | 5.98 | 8.71 | 3.08 | 5.20 | 5.39 | 2.60 | 2.60 | 2.65 | | | | | | |
| | AFB (*n*=20) | Mean | 44.9 | 41.8 | 40.0 | 41.4 | 43.0 | 39.8 | 39.3 | 38.0 | 38.0 | 37.2 | 39.0 | 37.8 | 15.058 | 0.001 | 3.227 | 0.050 | 2.426 | 0.086 |
| | | ±sd | 10.10 | 5.78 | 4.41 | 4.82 | 7.80 | 4.55 | 3.76 | 1.84 | 1.76 | 0.67 | 3.81 | 1.70 | | | | | | |
| | PMR (*n*=20) | Mean | 47.3 | 44.6 | 44.7 | 45.0 | 42.7 | 43.4 | 38.6 | 38.6 | 38.6 | 38.8 | 38.0 | 39.2 | 14.195 | 0.001 | 0.703 | 0.542 | 1.877 | 0.132 |
| | | ±sd | 7.94 | 11.12 | 9.40 | 10.59 | 7.83 | 7.13 | 3.28 | 5.21 | 5.86 | 4.60 | 2.16 | 7.49 | | | | | | |
| | RB (*n*=19) | Mean | 49.0 | 48.0 | 48.1 | 46.8 | 45.8 | 44.9 | 43.0 | 41.2 | 43.2 | 42.6 | 40.8 | 42.5 | 11.709 | 0.003 | 0.448 | 0.716 | 1.330 | 0.259 |
| | | ±sd | 9.18 | 15.26 | 13.26 | 15.46 | 11.59 | 12.46 | 11.34 | 10.25 | 15.18 | 14.06 | 10.89 | 10.98 | | | | | | |
| V | RM (*n*=19) | Mean | 43.0 | 38.3 | 38.4 | 38.1 | 38.4 | 39.0 | 37.2 | 36.4 | 36.8 | 36.4 | 35.0 | 37.1 | 10.143 | 0.005 | 3.504 | 0.031 | 3.447 | 0.018 |
| | | ±sd | 6.83 | 7.34 | 5.21 | 6.00 | 6.99 | 6.98 | 4.31 | 6.64 | 5.11 | 6.27 | 5.91 | 6.38 | | | | | | |
| | EHS (*n*=20) | Mean | 41.3 | 39.0 | 41.9 | 41.6 | 41.6 | 41.4 | 39.5 | 36.0 | 38.4 | 37.7 | 37.7 | 37.4 | 71.458 | 0.003 | 1.476 | 0.234 | 0.672 | 0.557 |
| | | ±sd | 5.89 | 6.34 | 6.80 | 10.09 | 10.09 | 8.73 | 7.78 | 6.52 | 7.90 | 8.25 | 8.25 | 8.29 | | | | | | |
| | AFB (*n*=20) | Mean | 43.0 | 38.1 | 42.6 | 38.1 | 36.4 | 36.6 | 41.6 | 36.5 | 39.6 | 38.8 | 36.7 | 36.5 | 1.152 | 0.297 | 7.703 | <0.001 | 2.485 | 0.037 |
| | | ±sd | 7.27 | 6.14 | 6.96 | 6.38 | 6.71 | 5.77 | 8.99 | 7.69 | 7.68 | 7.79 | 7.91 | 9.67 | | | | | | |
| | PMR (*n*=20) | Mean | 42.8 | 38.9 | 40.6 | 38.3 | 37.1 | 36.4 | 40.4 | 34.6 | 35.7 | 34.8 | 34.1 | 34.1 | 16.381 | 0.001 | 7.440 | <0.05 | 1.066 | <0.05 |
| | | ±sd | 8.78 | 7.89 | 8.17 | 6.94 | 6.66 | 7.32 | 7.75 | 6.91 | 6.13 | 4.58 | 4.99 | 7.13 | | | | | | |
| | RB (*n*=19) | Mean | 47.1 | 41.7 | 43.5 | 43.5 | 41.7 | 39.2 | 43.0 | 36.1 | 39.3 | 37.2 | 37.0 | 35.6 | 18.668 | <0.001 | 7.478 | <0.001 | 0.533 | 0.603 |
| | | ±sd | 10.16 | 10.17 | 11.46 | 11.32 | 9.91 | 10.30 | 11.15 | 7.04 | 9.51 | 9.41 | 8.76 | 7.91 | | | | | | |
| F | RM (*n*=19) | Mean | 50.5 | 48.2 | 48.9 | 46.6 | 45.8 | 45.9 | 41.7 | 42.9 | 44.2 | 41.3 | 42.4 | 42.1 | 25.451 | <0.001 | 1.353 | 0.269 | 4.689 | 0.001 |
| | | ±sd | 8.09 | 9.27 | 9.58 | 6.82 | 7.40 | 7.25 | 6.11 | 8.21 | 9.44 | 6.20 | 6.59 | 7.28 | | | | | | |
| | EHS (*n*=20) | Mean | 51.6 | 50.7 | 49.3 | 49.8 | 49.8 | 50.6 | 43.6 | 43.1 | 41.4 | 41.5 | 41.5 | 41.0 | 32.508 | <0.001 | 0.744 | 0.498 | 0.515 | 0.680 |
| | | ±sd | 8.53 | 10.40 | 9.27 | 10.46 | 10.46 | 10.11 | 8.33 | 8.64 | 6.74 | 6.19 | 6.19 | 5.90 | | | | | | |
| | AFB (*n*=20) | Mean | 56.4 | 48.1 | 50.3 | 47.3 | 49.0 | 47.9 | 44.9 | 42.4 | 43.0 | 41.4 | 41.5 | 41.2 | 19.781 | <0.001 | 3.917 | 0.014 | 3.484 | 0.005 |
| | | ±sd | 11.82 | 9.56 | 8.21 | 10.90 | 10.87 | 9.80 | 9.20 | 5.00 | 4.84 | 5.78 | 6.43 | 5.53 | | | | | | |
| | PMR (*n*=20) | Mean | 54.9 | 47.6 | 50.8 | 48.0 | 47.5 | 48.4 | 42.7 | 42.2 | 41.7 | 40.7 | 40.8 | 41.4 | 24.747 | <0.001 | 3.994 | 0.009 | 3.648 | 0.016 |
| | | ±sd | 8.35 | 10.09 | 9.51 | 9.05 | 9.11 | 10.79 | 6.97 | 8.88 | 9.02 | 7.51 | 6.63 | 7.75 | | | | | | |
| | RB (*n*=19) | Mean | 54.9 | 49.8 | 52.7 | 50.4 | 50.0 | 52.2 | 47.4 | 43.1 | 45.4 | 44.8 | 44.3 | 47.4 | 28.552 | <0.001 | 1.473 | 0.206 | 0.706 | 0.620 |
| | | ±sd | 11.14 | 11.84 | 10.87 | 11.53 | 10.97 | 12.45 | 10.60 | 10.36 | 10.39 | 11.32 | 11.02 | 13.20 | | | | | | |

*(Continued)*

**Table 4: (Continued)**

| Instrument (Subscales of POMS-SF) | 5 practice groups | | Before practicing in six time points | | | | | | After practicing in six time points | | | | | | Two way Factorical Analysis of Variance | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Main effect with practices | | Main effect with times | | Interaction | |
| | | | 1th | 2th | 3th | 4th | 5th | 6th | 1th | 2th | 3th | 4th | 5th | 6th | *F* | *P* | *F* | *P* | *F* | *P* |
| C | RM (*n*=19) | Mean | 52.6 | 50.4 | 52.6 | 48.9 | 48.8 | 49.4 | 45.9 | 47.4 | 47.7 | 46.9 | 48.0 | 46.7 | 13.194 | 0.002 | 1.361 | 0.246 | 3.183 | 0.032 |
| | | ±sd | 9.13 | 7.32 | 8.57 | 6.71 | 5.90 | 6.43 | 6.71 | 5.71 | 6.32 | 4.61 | 6.24 | 6.51 | | | | | | |
| | EHS (*n*=20) | Mean | 52.1 | 50.7 | 49.2 | 51.2 | 51.2 | 50.8 | 47.1 | 47.4 | 46.4 | 46.1 | 46.1 | 45.5 | 15.852 | 0.001 | 0.510 | 0.666 | 1.333 | 0.271 |
| | | ±sd | 7.80 | 10.39 | 8.73 | 10.03 | 10.03 | 12.00 | 8.98 | 8.95 | 5.28 | 5.36 | 5.36 | 5.94 | | | | | | |
| | AFB (*n*=20) | Mean | 59.3 | 54.1 | 52.9 | 53.3 | 53.9 | 52.6 | 48.0 | 49.1 | 48.7 | 47.9 | 48.0 | 47.3 | 24.418 | <0.001 | 1.159 | 0.335 | 5.233 | 0.001 |
| | | ±sd | 11.27 | 10.58 | 9.69 | 9.49 | 10.64 | 9.57 | 7.35 | 7.90 | 8.05 | 7.90 | 4.77 | 5.32 | | | | | | |
| | PMR (*n*=20) | Mean | 55.1 | 53.6 | 55.2 | 52.4 | 51.8 | 53.7 | 47.4 | 46.7 | 48.8 | 46.9 | 47.6 | 48.8 | 9.045 | <0.001 | 1.149 | 0.339 | 0.918 | 0.442 |
| | | ±sd | 13.31 | 12.98 | 13.86 | 11.66 | 10.43 | 12.31 | 8.00 | 8.34 | 9.63 | 7.49 | 7.62 | 9.48 | | | | | | |
| | RB (*n*=19) | Mean | 55.1 | 53.6 | 55.2 | 52.4 | 51.8 | 53.7 | 47.4 | 46.7 | 48.8 | 46.9 | 47.6 | 48.8 | 11.021 | 0.004 | 0.885 | 0.495 | 0.586 | 0.628 |
| | | ±sd | 13.31 | 12.98 | 13.86 | 11.66 | 10.43 | 12.31 | 8.00 | 8.34 | 9.63 | 7.49 | 7.62 | 9.48 | | | | | | |

TA: Tension-Anxiety, DD: Depression-Dejection, AH: Anger-Hostility, V: Vigor, F: Fatigue, C: Confusion, POMS-SF: Short Form of the Profile of Mood States, RM: Relax Music, EHS: Electric Heat Stimuli, AFB: Aroma Foot Bathing, PMR: Progressive Muscle Pelaxation, RB: Resting on Bed

Guide Book of Cancer in Japan shows that the POMS-SF scale was useful to measure psychological states in describing the case studies of aroma therapy and music therapy.[6] A study of music therapy showed that nurses working in stressful situations at a hospital achieved a reduction in stress after listening to classical music during their day shift break time; their blood pressure lowered after the intervention.[26] Hence, music therapy was effective physiologically by lowering blood pressure; this finding differs slightly from our results. This difference could be because of the differences between RM and classical music or because of other reasons. Further study on music therapy is needed because it involves various influencing factors. EHS was used for 12 breast cancer patients with peripheral neurological numbness caused by chemotherapy treatment.[27] The study found that EHS was not significantly effective for improving physiological and psychological parameters although the patients were satisfied with EHS therapy. The study shows the same physiological result as the present study, but a slightly different psychological result in the POMS-SF. Further study of EHS with a large sample is needed to investigate psychological and physiological effects.

### *Relationships between four complementary therapies and resting on bed*

No significant differences were observed in the changes of the POMS-SF subscales in 6 time points between the four CTs of RM, EHS, AFB, and PMR as intervention groups and RB as a control group. The four CTs of RM, EHS, AFB, and PMR were not more effective than RB, whereas RM, EHS, AFB, PMR, and RB were effective for stress reduction. However, differences were found in vigor and confusion of AFB unlike with RB. Therefore, AFB was a more effective CT than RB in vigor and confusion for stress reduction. Thus, AFB is most useful for stress reduction.

## Conclusion

RM, EHS, AFB, PMR, and RB were effective for reducing the stress level of highly stressed nurses based on both physiological (i.e. pulse rate and blood pressure) and psychological (i.e. POMS-SF subscales) measures, whereas RM, EHS, AFB, and PMR were not more effective than RB. The four CTs were found to relieve tension–anxiety, depression–dejection, anger–hostility, fatigue, confusion, and vigor in high-stress nurses. AFB was most effective when considering all the psychological and physical measurements included in this study. CTs could be used for highly stressed nurses as a form of self-management and as a nursing skill to reduce stress in distressed patients. Given the results of this study, hospitals may provide CT for nurses with high stress levels to improve their psychological and physiological states.

This study has some limitations. The 3-week duration of the CT practice was a long time for busy nurses to practice twice per week after their hospital shift. Thus, more sensitive ways of providing CT to patients will be considered because they are in a more delicate psychological and physical state. Other limitations include the small number of participants in each CT group. Therefore, a large sample will be taken in future studies to improve precision.

In the future, the CTs will be studied for their effectiveness in improving the QoL of cancer survivors.

**Table 5: Comparison of changes in the subscales of POMS -SF between RM, EHS, AFB, PMR and RB**

| Instrument (Subscales of POMS-SF) | 5 practice groups | | Four groups of RM, EHS, AFB, PMR | | | | | | RB (Resting on Bed) | | | | | | Two way Factorical Analysis of Variance | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | Main effect with practices | | Main effect with times | | Interaction | |
| | | | 1th | 2th | 3th | 4th | 5th | 6th | 1th | 2th | 3th | 4th | 5th | 6th | *F* | *P* | *F* | *P* | *F* | *P* |
| TA | RM ($n$=19) | Mean | −10.7 | −5.7 | −7.2 | −5.7 | −4.8 | −3.9 | | | | | | | 0.000 | 0.996 | 3.491 | 0.010 | 1.631 | 0.154 |
| | | ±sd | 8.92 | 6.46 | 5.98 | 6.08 | 5.90 | 6.01 | | | | | | | | | | | | |
| | EHS ($n$=20) | Mean | −10.8 | −8.7 | −10.5 | −7.8 | −7.8 | −7.8 | −7.9 | −5.0 | −5.7 | −6.9 | −5.4 | −7.1 | 1.176 | 0.285 | 1.557 | 0.187 | 0.977 | 0.413 |
| | | ±sd | 8.66 | 8.30 | 9.38 | 10.65 | 10.65 | 8.31 | 7.77 | 5.41 | 7.10 | 8.81 | 7.82 | 9.02 | | | | | | |
| | AFB ($n$=20) | Mean | −10.8 | −8.5 | −10.2 | −5.9 | −7.2 | −8.4 | | | | | | | 0.781 | 0.383 | 1.685 | 0.140 | 1.170 | 0.326 |
| | | ±sd | 12.02 | 8.75 | 11.04 | 8.52 | 9.46 | 11.34 | | | | | | | | | | | | |
| | PMR ($n$=20) | Mean | −12.3 | −8.2 | −9.3 | −9.3 | −7.6 | −8.3 | | | | | | | 1.628 | 0.210 | 1.915 | 0.121 | 0.350 | 0.817 |
| | | ±sd | 9.07 | 11.66 | 9.32 | 6.84 | 11.32 | 9.29 | | | | | | | | | | | | |
| D | RM ($n$=19) | Mean | −4.4 | −2.7 | −3.6 | −2.8 | −1.0 | −1.4 | | | | | | | 1.421 | 0.241 | 1.267 | 0.280 | 0.942 | 0.443 |
| | | ±sd | 4.93 | 4.53 | 4.35 | 6.35 | 2.96 | 5.60 | | | | | | | | | | | | |
| | EHS ($n$=20) | Mean | −6.9 | −5.7 | −4.5 | −4.2 | −4.2 | −3.6 | −4.5 | −3.3 | −4.1 | −4.5 | −4.8 | −3.2 | 0.381 | 0.541 | 1.114 | 0.353 | 0.856 | 0.495 |
| | | ±sd | 6.33 | 5.81 | 5.49 | 6.09 | 6.09 | 3.87 | 4.93 | 5.99 | 5.12 | 5.27 | 6.96 | 5.51 | | | | | | |
| | AFB ($n$=20) | Mean | −6.1 | −4.2 | −4.3 | −3.9 | −4.8 | −3.5 | | | | | | | 0.069 | 0.795 | 0.995 | 0.422 | 0.266 | 0.917 |
| | | ±sd | 8.07 | 6.19 | 5.56 | 6.17 | 7.26 | 5.32 | | | | | | | | | | | | |
| | PMR ($n$=20) | Mean | −8.0 | −5.5 | −5.4 | −5.0 | −3.7 | −2.2 | | | | | | | 0.213 | 0.647 | 2.149 | 0.062 | 1.294 | 0.274 |
| | | ±sd | 7.93 | 11.83 | 6.21 | 11.10 | 7.55 | 6.63 | | | | | | | | | | | | |
| AH | RM ($n$=19) | Mean | −6.5 | −4.4 | −4.4 | −3.8 | −2.6 | −3.6 | | | | | | | 0.119 | 0.732 | 2.143 | 0.079 | 0.809 | 0.521 |
| | | ±sd | 6.96 | 4.93 | 6.42 | 5.59 | 6.63 | 7.27 | | | | | | | | | | | | |
| | EHS ($n$=20) | Mean | −7.1 | −5.2 | −3.7 | −4.7 | −4.7 | −4.4 | −6.0 | −6.8 | −4.8 | −4.2 | −5.0 | −2.4 | 0.002 | 0.963 | 2.225 | 0.070 | 0.747 | 0.559 |
| | | ±sd | 5.35 | 5.01 | 5.01 | 5.79 | 5.79 | 7.91 | 8.66 | 10.51 | 7.97 | 9.01 | 6.28 | 5.01 | | | | | | |
| | AFB ($n$=20) | Mean | −5.6 | −3.8 | −2.0 | −4.2 | −4.0 | −2.0 | | | | | | | 0.594 | 0.446 | 2.714 | 0.022 | 0.704 | 0.598 |
| | | ±sd | 8.15 | 5.36 | 4.38 | 4.84 | 4.98 | 4.47 | | | | | | | | | | | | |
| | PMR ($n$=20) | Mean | −8.7 | −6.0 | −6.1 | −6.2 | −4.7 | −4.2 | | | | | | | 0.268 | 0.608 | 2.523 | 0.044 | 0.623 | 0.644 |
| | | ±sd | 7.88 | 9.35 | 6.58 | 10.02 | 7.76 | 8.73 | | | | | | | | | | | | |
| V | RM ($n$=19) | Mean | −5.8 | −1.9 | −1.5 | −1.7 | −3.4 | −1.9 | | | | | | | 2.169 | 0.150 | 0.998 | 0.440 | 1.769 | 1.154 |
| | | ±sd | 4.98 | 4.00 | 3.66 | 5.56 | 5.71 | 6.27 | | | | | | | | | | | | |
| | EHS ($n$=20) | Mean | −1.9 | −3.1 | −3.6 | −3.9 | −3.9 | −4.0 | −4.1 | −5.6 | −4.2 | −6.3 | −4.7 | −3.6 | 0.857 | 0.361 | 0.682 | 0.560 | 0.497 | 0.678 |
| | | ±sd | 4.97 | 5.21 | 7.12 | 6.48 | 6.48 | 5.84 | 9.48 | 8.53 | 6.36 | 7.11 | 5.23 | 6.53 | | | | | | |
| | AFB ($n$=20) | Mean | −1.4 | −1.6 | −3.0 | 0.7 | 0.3 | −0.2 | | | | | | | 8.502 | 0.006 | 0.743 | 0.527 | 1.472 | 0.226 |
| | | ±sd | 6.19 | 4.38 | 4.72 | 4.51 | 4.31 | 5.67 | | | | | | | | | | | | |
| | PMR ($n$=20) | Mean | −2.4 | −4.3 | −5.0 | −3.5 | −3.0 | −2.4 | | | | | | | 0.932 | 0.341 | 0.995 | 0.397 | 0.460 | 0.705 |
| | | ±sd | 6.48 | 7.22 | 5.27 | 4.57 | 5.54 | 3.86 | | | | | | | | | | | | |
| F | RM ($n$=19) | Mean | −8.8 | −5.3 | −4.7 | −5.4 | −3.4 | −3.8 | | | | | | | 0.450 | 0.507 | 3.101 | 0.010 | 0.860 | 0.496 |
| | | ±sd | 7.43 | 4.38 | 6.15 | 5.34 | 4.57 | 6.08 | | | | | | | | | | | | |
| | EHS ($n$=20) | Mean | −8.0 | −7.6 | −7.9 | −8.3 | −8.3 | −9.7 | −7.5 | −6.8 | −7.4 | −5.5 | −5.7 | −4.8 | 1.131 | 0.294 | 0.176 | 0.971 | 1.111 | 0.354 |
| | | ±sd | 7.76 | 8.58 | 7.75 | 6.63 | 6.63 | 8.47 | 6.90 | 7.49 | 9.14 | 6.27 | 7.26 | 6.30 | | | | | | |
| | AFB ($n$=20) | Mean | −11.5 | −5.7 | −7.3 | −5.9 | −7.5 | −6.7 | | | | | | | 0.303 | 0.585 | 2.777 | 0.030 | 1.084 | 0.367 |
| | | ±sd | 9.12 | 8.27 | 7.52 | 9.55 | 8.85 | 8.95 | | | | | | | | | | | | |
| | PMR ($n$=20) | Mean | −12.2 | −5.4 | −9.1 | −7.3 | −6.7 | −7.0 | | | | | | | 0.688 | 0.412 | 3.086 | 0.018 | 1.166 | 0.328 |
| | | ±sd | 9.64 | 8.88 | 8.52 | 8.14 | 9.45 | 8.01 | | | | | | | | | | | | |
| C | RM ($n$=19) | Mean | −6.6 | −3.0 | −4.9 | −2.1 | −0.8 | −2.7 | | | | | | | 0.018 | 0.895 | 2.234 | 0.080 | 1.380 | 0.250 |
| | | ±sd | 7.91 | 5.66 | 7.09 | 4.01 | 6.39 | 5.09 | | | | | | | | | | | | |
| | EHS ($n$=20) | Mean | −5.0 | −3.3 | −2.9 | −5.2 | −5.2 | −5.4 | −4.6 | −2.6 | −2.7 | −2.3 | −4.2 | −2.7 | 0.764 | 0.388 | 1.151 | 0.334 | 0.588 | 0.682 |
| | | ±sd | 6.33 | 7.21 | 5.80 | 6.07 | 6.07 | 6.32 | 7.77 | 6.11 | 4.72 | 5.06 | 8.82 | 5.28 | | | | | | |
| | AFB ($n$=20) | Mean | −11.3 | −5.0 | −4.2 | −5.5 | −5.9 | −5.3 | | | | | | | 3.303 | 0.077 | 4.044 | 0.004 | 1.318 | 0.266 |
| | | ±sd | 9.17 | 8.04 | 6.34 | 7.11 | 7.63 | 6.51 | | | | | | | | | | | | |
| | PMR ($n$=20) | Mean | −7.7 | −7.0 | −6.4 | −5.5 | −4.2 | −5.0 | | | | | | | 1.553 | 0.221 | 0.861 | 0.488 | 0.664 | 0.615 |
| | | ±sd | 10.62 | 12.77 | 9.43 | 11.15 | 8.94 | 9.30 | | | | | | | | | | | | |

TA:Tension-Anxiety, DD:Depression-Dejection, AH:Anger-Hostility, V:Vigor, F:Fatigue, C:Confusion. POMS-SF:Short Form of the Profile of Mood States. RM:Relax Music, EHS:Electric Heat Stimuli, AFB:Aroma Foot Bathing, PMR:Progressive Muscle Pelaxation, RB:Resting on Bed

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### *Conflicts of interest*

There are no conflicts of interest.

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