

*Original Article***Effect of Massage on Fatigue and Mood in Female Rowers****Maryam Aeini ^{1*}**

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Abstract: The present research aims to investigate the effect of massage on fatigue and mood in female rowers. Pre-test and post-test of quasi-experimental design with a control group was used for the experiment. Participants in the study were 30 female rowers from Tehran province who participated voluntarily. The volunteer sample was randomly assigned into two experimental and control groups (15 people in each group). Pre-test was carried out for both groups. The subjects in the experimental group then participated in 12 massage sessions under the supervision of a massage expert. Meanwhile, both groups also continued their normal rowing exercises. At the end of the intervention, post-test was carried out for both groups. Rating of perceived exertion and fatigue scale (Borg, 1982), mood questionnaire (Vaez Mousavi, 2007), and a researcher-made questionnaire were used to measure variables. Statistical analysis of variance with repeated measurements was used to test the hypotheses. The results suggested that perceived intensity and fatigue were significantly reduced in the massage group compared to the control group ($P < 0.05$). Also, anger ($P=0.002$), confusion ($P=0.02$), depression ($P=0.028$), mood fatigue ($P=0.015$), and stress ($P=0.039$) significantly decreased in the massage group compared to the control group. Force increased significantly in the massage group compared to the control group ($P=0.008$). In general, the results showed that 12 massage sessions could be used to decrease fatigue and improve mood in female rowers.

Keywords: Massage; Mood; Fatigue; Rowing; Depression;

1. Introduction

Championship is a social phenomenon to discover the maximum of human capabilities by participating in specific competition activities (Matveev, 2002). Undoubtedly, athletes need to use all their potential to achieve their desired results and endure a lot of physical and psychological pressure. In most sports, the volume and intensity of pressure on athletes is such that it causes musculoskeletal injuries, depletion of energy, accumulation of waste as well as dysfunction of the immune system. In such circumstances, various recovery methods are used to restore the body's energy reserves, decrease lactate accumulation, and eliminate or decrease the fatigue level of the central and peripheral nervous system (Moraska, 2005).

In recent decades, the issue of returning to the original state after performing sports activities has attracted the attention of many researchers. It is a common belief that external interventions with various recovery tools lead to better restoration of the functional reserves of the athlete's body and achieve better results (Alexander et al., 2007). Hence, measures related to returning to the original state are as important as physical activity, because insufficient restoration of the body's functional capacities amid training activities or competitions decreases the athlete's working capacity. In other words, the adaptation of the organism to the conditions of training or competition will increase by rationally scheduling the recovery program and physical activity. In this regard, massage has long been used as a complementary method to treat, improve performance, and prevent injuries (Goodwin, 2002).

Massage is a systematic form of mechanical manipulation of body's soft tissues by the hands, which is performed for therapeutic purposes to increase the level of health and comfort. Due to its unique applications, this intervention is a method that is used today in many fields such as therapy, rehabilitation, etc. (Shojaoddin et al., 2009). Many coaches, athletes and sports therapists believe based on their observations and experiences that massage has many benefits for the body including increased blood flow and decreased muscle tension, decreased levels of nervous irritability and anxiety. According to them, massage improves athletic performance and prevents injuries. However, the scientific evidence for the effects of massage before training on performance and injury prevention is very limited (Pinar et al., 2012; Weerapong et al., 2005).

Nowadays, although massages amid competition are widely used assuming that it can accelerate the process of returning to the original state and improving the athlete's level of readiness in

competitions, unfortunately very little research has investigated this claim on rowers. Massage may also affect athletes' mood. Because of the sedative responses that result from massage, several mechanisms have been proposed that are used as complementary therapy to increase serotonin and dopamine and decrease cortisol to treat patients with depression (Field et al., 2012). Massage increases arterial, venous, local blood flow and volume stroke, increases serotonin and dopamine, decreases cortisol and inhibits the pain mechanism, improves lymph drainage and eliminates insomnia. In addition, massage stimulates the sympathetic tone of the central nervous system and reduces heart rate and respiration, and as a result, causes a feeling of relaxation (Vafamand et al., 2013). Massage has shown beneficial and positive effects in the treatment of anxiety (Fellowes et al., 2004). In a study conducted by Jiro Imanishi et al. in Japan, the anxiolytic effect of aromatherapy massage (massage with special oils) for 4 weeks (2 sessions per week, 30 minutes per session) for breast cancer patients and observed a decrease in anxiety in the patients (Jiro et al., 2009). Another research by Hernandez Reif et al. (2004) was conducted that investigated massage of patients with Swedish massage for 11 weeks in two stages of 5 weeks and 6 weeks (2 sessions per week, 30 minutes per session) in the neck, chest, back, upper and lower limbs. The results of this study showed a decrease in the levels of stress hormones such as cortisol, epinephrine and norepinephrine, as well as a decrease in anxiety.

In general, various studies have been conducted on the physiological and psychological effects of massage in athletes, but the results are not all consistent. However, as mentioned, so far less research has been carried out in this regard on rowers. One of the studies has investigated the effect of massage on the physiological and psychological characteristics of athletes. Hemmings et al. (2000) concluded that psychological effect of massage is more pronounced than its physiological and functional effects by comparing the effects of restoration with and without massage on the physiological, psychological, and functional indicators of amateur boxers in serial activities. In another study, Pilevarzadeh et al. (2002) investigated the effect of massage on reducing pain and anxiety during work. The results showed that in each group, there was an increase in work-related pain progressively, but in the massage group, the amount of pain was less than the control group and the level of anxiety at the end of the test was significantly reduced in the massage group. The results of the study by Motevasselian et al. (2003) entitled "the effect of massage on the pain and anxiety of burn



patients before dressing showed that massage before dressing reduces pain and anxiety after dressing. Susanne et al. (2010) conducted a study entitled "the effect of massage therapy on pain, anxiety, and tension in cardiac surgical patients. According to the results, they suggested that massage be performed as an important part in the management of the recovery period after surgery for people with cardiac disease. Mancinelli et al. (2006) conducted a study entitled "the effects of massage on delayed onset muscle soreness (DOMS) and physical performance in female collegiate athletes." The results of this study supported the reduction of DOMS and the improvement of vertical jump in female collegiate athletes through massage.

However, since no research has been carried out to investigate the effect of massage on the fatigue and mood of female rowers or it is beyond the reach of the researcher, in this study we seek to answer the question of whether massage affects the fatigue and mood of female rowers.

2. Methods

The present research is applied and quasi-experimental. This research is a quasi-experimental study with a pretest and posttest design and a control group. The population of the present research includes female rowers in Tehran in the spring of 2018. The sample of the research is 30 female rowers in Tehran province who participated in this study voluntarily. Then, they were randomly assigned to experimental and control groups (15 people in each group). There was no significant difference between the experimental and control groups in terms of age, height, weight, and BMI. First, in one session, the whole research process along with its objectives and possible consequences were explained to the subjects and their demographic information was obtained from them along with voluntary written consent. They also attended an introductory session on how to perform the interventions a week before the study. On the day of pre-test, fatigue and mood of both groups were assessed through a questionnaire. Then, the subjects of the experimental group participated in 12 massage sessions under the supervision of a massage therapist. However, the control group did not receive this intervention. Both groups continued their normal rowing exercises. Precise control of nutrition was not possible and subjects in both groups were asked to continue their normal diet. At the end of the intervention period (12 massage sessions for the experimental group), both groups attended the post-test session and again the fatigue and mood of both groups were assessed through a questionnaire. In order to compare and investigate the changes of variables in the two research groups

and in two measurement times (pre-test and post-test), the statistical test of analysis of variance between-within subjects with repeated measurements in a 2×2 design (2 groups and 2 times) was used. However, before performing the analysis of variance test, a comparison was made between the pretests of the two groups using independent t-test in order to use analysis of covariance instead of analysis of variance for testing the hypotheses. The significance level was considered to be $P \leq 0.05$. All statistical calculations were performed using SPSS software version 19.

2-1. Measurement tools

2-1-1. Fatigue scale

In the present research, the perceived intensity of the exercise was first measured by the Borg's (1982) rating of perceived exertion (RPE), and the fatigue was assessed using the fatigue scale developed based on this scale. Rating of perceived exertion (RPE), a 15-point class scale for perceived exertion rating, is used as a guide to exercise intensity. In this method, people express their perception of the difficulty of what they are doing. RPE grades are used to determine when a person will reach their maximum tolerance. It has been found that this is the most appropriate method for selecting the appropriate intensity of exercise and can be used to complete heart rate estimates. Studies have shown that the RPE is highly correlated with both the amount of blood lactic acid and the amount of muscle lactic acid, both of which are biochemical signs of cardiorespiratory and muscular fatigue (Borg, 1982). Borg also found the validation of this scale appropriate ($r=0.92$). The fatigue scale was designed according to the same scale.

2-1-2. Mood questionnaire

In the present research, Vaez Mousavi (2007) mood questionnaire was used to measure mood swings. This questionnaire has six subscales of anger, confusion, depression, mood fatigue, stress, and vitality. This questionnaire has 24 questions that each sub-scale has four questions. Each question has five options: never, slightly, moderate, high, and very high, one of which is marked by the person and its scores is determined through the Likert scale as never (0), slightly (1), moderate (2), high (3), and very high (4). The scores of each subscale are calculated by summing the scores of each question on that scale (four questions) and the range of scores for each subscale is 0-16. In this questionnaire, the lower the score of anger, confusion, depression, fatigue, and stress subscales, the more desirable the person's condition and in contrast, the higher the score of vitality, the better the person's condition.



2-1-3. Massage program

In this study, aromatherapy massage with two massage oils with lemon essential oil and lavender was used. The total duration of the massage intervention in the experimental group was 12 sessions in two weeks, in other words, six sessions per week, and each session lasted for 30 minutes after specific exercises. The control group performed only their daily exercises and program, including specific exercises, so that these exercises were common between the two groups. The stages of the massage were as follows: questionnaire, interview, therapist preparation, environment, necessary equipment, effleurage, friction, tapotement, oils. The masseuse obtained information about the athlete's condition and medical history by a special form prepared to collect information.

Talking to the athlete: Interviewing and talking to the athlete, like other aspects of measurement, has a dual purpose: one general goal and several partial goals. On the one hand, we need to know the cause of the problems, and on the other hand, we need to pay attention to the symptoms of pain. In some cases, injuries may occur at a particular time and during a particular movement. For example, when rowing, severe pain is felt in the shoulder. Understanding the cause of the problem is very difficult and requires careful investigation and testing. We note that most of the time the answers to the questions lie in the information obtained during the interview. Therefore, during the massage, the athlete was talked to.

Therapist preparation: Before touching, the therapist would prepare herself. Attention to personal appearance, hygiene, and makeup of the skin and nails and not wearing a watch and ring were considered.

Environment: A warm and well-ventilated environment that was not exposed to rapid air currents was considered.

Equipment included linens, small and large washable blankets with covers, well-sized pillows and their covers, and a massage bed.

The massage techniques were as follows:

Effleurage (stroking): which is one of the main massage movements that is performed anywhere on the body. This movement included the beginning and end of the massage and facilitated the work flow from one movement to the next.

Friction (rubbing): Friction movements are usually performed using the thumb tips. Performing circular movements of the thumb tips (frictions), we moved the muscles towards the bone and stopped on the desired area and put a lot of pressure on it.

Pétrissage technique (gripping and squeezing the muscles): involves gripping, squeezing, pressing, rolling, and twisting, and is a powerful movement in which we massaged the muscles deeply and applied these movements to other parts of the body (except for the face), which is especially useful for fleshy and boneless areas such as the thighs and buttocks.

Tapotement (tapping movements): This technique consists of a series of fast and light tapping movements that are applied regularly and intermittently by the hands.

Oils: The only correct method of massage is to use oil that prevents scratches on the body. Therefore, in this study, lemon and lavender oils were used for massage.

3. Results

The results of analysis of mixed variance between-within subjects by repeated measurements to compare changes in perceived intensity of the two groups are reported in Table 1. In addition, the results of independent t-test to compare the difference between the means of the two groups are summarized in Table 2.

Table 1. Results of analysis of mixed variance between-within subjects to compare changes in perceived intensity of subjects in the two groups

| Factor | F | P | Effect size |
|------------|--------|---------|-------------|
| Time | 611.59 | * 0.001 | 0.98 |
| group | 6.90 | * 0.014 | 0.19 |
| Time×Group | 5.47 | * 0.005 | 0.38 |

* Significant at the level of $P \leq 0.05$



Table 2. Results of independent t-test to compare the difference between the means of the two groups for perceived intensity

| Comparison of differences | t | P |
|---|------|---------|
| Comparison of the difference before and after pre-test | 3.15 | * 0.004 |
| Comparison of the difference before and after post-test | 4.09 | * 0.01 |
| Comparison of the difference between pre-test and post-test | 2.58 | * 0.015 |

* Significant at the level of $P \leq 0.05$

As can be seen, perceived intensity decreased significantly in the massage group compared to the control group ($P < 0.05$).

The results of analysis of mixed variance between-within subjects by repeated measurements to

compare changes in fatigue of the two groups are reported in Table 3. In addition, the results of independent t-test to compare the difference between the means of the two groups are summarized in Table 4.

Table 3. Results of analysis of mixed variance between-within subjects to compare changes in fatigue of subjects in the two groups

| Factor | F | P | Effect size |
|------------|--------|---------|-------------|
| Time | 201.02 | * 0.001 | 0.95 |
| group | 4.50 | * 0.043 | 0.13 |
| Time×Group | 8.43 | * 0.001 | 0.49 |

* Significant at the level of $P \leq 0.05$

Table 4. Results of independent t-test to compare the difference between the means of the two groups for fatigue

| Comparison of differences | t | P |
|---|------|---------|
| Comparison of the difference before and after pre-test | 2.52 | *0.017 |
| Comparison of the difference before and after post-test | 3.66 | * 0.001 |
| Comparison of the difference between pre-test and post-test | 2.13 | * 0.041 |

* Significant at the level of $P \leq 0.05$

As can be seen, fatigue decreased significantly in the massage group compared to the control group ($P < 0.05$).

The results of analysis of mixed variance between-within subjects by repeated measurements to

compare changes in anger of the two groups are reported in Table 5.

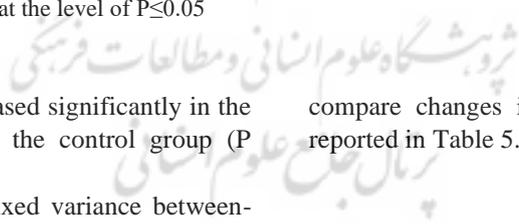
Table 5. Results of analysis of mixed variance between-within subjects to compare changes in anger of subjects in the two groups

| Factor | F | P | Effect size |
|------------|-------|---------|-------------|
| Time | 6.65 | * 0.015 | 0.19 |
| group | 10.04 | * 0.004 | 0.26 |
| Time×Group | 12.37 | * 0.002 | 0.30 |

* Significant at the level of $P \leq 0.05$

As can be seen, anger decreased significantly in the massage group compared to the control group ($P = 0.002$).

The results of analysis of mixed variance between-within subjects by repeated measurements to



compare changes in confusion of the two groups are reported in Table 6.

Table 6. Results of analysis of mixed variance between-within subjects with repeated measurements to compare changes in confusion of subjects in the two groups

| Factor | F | P | Effect size |
|------------|------|--------|-------------|
| Time | 1.77 | 0.19 | 0.06 |
| group | 0.47 | 0.49 | 0.01 |
| Time×Group | 6.13 | * 0.02 | 0.18 |

* Significant at the level of $P \leq 0.05$

As can be seen, confusion decreased significantly in the massage group compared to the control group ($P = 0.002$).

The results of analysis of mixed variance between-within subjects by repeated measurements to

compare changes in depression of the two groups are reported in Table 7.

Table 7. Results of analysis of mixed variance between-within subjects to compare changes in depression of subjects in the two groups

| Factor | F | P | Effect size |
|------------|------|---------|-------------|
| Time | 1.92 | 0.17 | 0.06 |
| group | 0.27 | 0.60 | 0.01 |
| Time×Group | 5.34 | * 0.028 | 0.16 |

* Significant at the level of $P \leq 0.0$

As can be seen, depression decreased significantly in the massage group compared to the control group ($P = 0.0028$).

The results of analysis of mixed variance between-within subjects by repeated measurements to

compare changes in mood fatigue of the two groups are reported in Table 8.

Table 8. Results of analysis of mixed variance between-within subjects to compare changes in mood fatigue of subjects in the two groups

| Factor | F | P | Effect size |
|------------|-------|---------|-------------|
| Time | 0.38 | 0.54 | 0.013 |
| group | 0.002 | 0.96 | 0.001 |
| Time×Group | 6.69 | * 0.015 | 0.19 |

* Significant at the level of $P \leq 0.05$

As can be seen, mood fatigue decreased significantly in the massage group compared to the control group ($P = 0.015$).

The results of analysis of mixed variance between-within subjects by repeated measurements to

compare changes in stress of the two groups are reported in Table 9.

Table 9. Results of analysis of mixed variance between-within subjects to compare changes in stress of subjects in the two groups

| Factor | F | P | Effect size |
|------------|------|-------|-------------|
| Time | 1.35 | 0.25 | 0.04 |
| group | 1.01 | 0.32 | 0.03 |
| Time×Group | 4.67 | 0.039 | 0.14 |

* Significant at the level of $P \leq 0.05$



As can be seen, stress decreased significantly in the massage group compared to the control group ($P=0.039$).

The results of analysis of mixed variance between-within subjects by repeated measurements to

compare changes in force of the two groups are reported in Table 10.

Table 10. Results of analysis of mixed variance between-within subjects to compare changes in force of subjects in the two groups

| Factor | F | P | Effect size |
|------------|------|---------|-------------|
| Time | 0.61 | * 0.44 | 0.02 |
| group | 0.33 | 0.56 | 0.01 |
| Time×Group | 8.26 | * 0.008 | 0.22 |

* Significant at the level of $P \leq 0.05$

As can be seen, force decreased significantly in the massage group compared to the control group ($P=0.008$)

4. Discussion

According to the findings of the present research, a short period of massage led to a significant decrease in fatigue and a significant improvement in mood of female rowers. It seems that in this research, for the first time, the effect of massage on fatigue and mood of rowers are investigated and previous studies have been conducted more on other athletes. Moreover, studies that have studied the effect of massage on athletes have usually considered other physiological variables such as heart rate and physical and bioenergetic functions, and those that have investigated the effect of massage on fatigue and moods have usually studied non-athletes and mostly patients. Therefore, caution should be exercised in interpreting the present findings, as the results of this study cannot simply be compared with other studies. In any case, the findings of this study are somehow and to some extents are consistent with the findings of Karen et al. (2009) and Furlan et al. (2009) abroad and with the findings of Abbasi et al. (2011), Yaghoubi et al. (2009) and Jozi (2009) in the country. The results of Bahraini et al. (2011) with the aim of comparing the effect of effleurage massage with aromatic and non-aromatic oils on the severity of fatigue in women with multiple sclerosis also showed that massage reduces the severity of fatigue in this group of patients. The results of the study by Lee et al. (2005) with the aim of investigating the effect of foot reflexology massage on the severity of fatigue and insomnia in patients with coal workers' pneumoconiosis also showed that foot reflexology massage can be an effective nursing intervention in reducing insomnia and fatigue of this group of patients. The results of the study by Ko et al. (2007) with the aim of investigating the effect of self-foot

reflexology on the severity of fatigue and sleep in nurses showed that self-foot reflexology massage also reduces the severity of pain and insomnia in this group. Rodenburg et al. (1994), Smith et al. (1994) and Tiidus et al. (1995) showed that massage partially reduces the symptoms by the delayed onset muscle soreness syndrome. Karagozoglu et al. (2013) who conducted a study to investigate the effect of back massage on chemotherapy-related fatigue showed that massage during chemotherapy for 60 to 70 minutes alternately had an effect on subjects' fatigue and decreased it. They write that massage as an effective and complementary method along with other common treatments as a non-drug and low-complication treatment is effective in significantly reducing and relieving fatigue. Atashi et al. (2014) conducted a study entitled "investigating the effect of superficial stroke back massage on fatigue in patients with MS" in which 64 men and women with an age range of 20-45 years admitted to the Qazvin MS Association participated in it and divided into intervention and control groups and the intervention group received massage for 10 minutes during 7 sessions. The results showed that superficial stroke back massage could be effective as a method to relieve fatigue in these patients. Furthermore, the study by Hassankhani et al. (2013) with the aim of investigating the effect of superficial stroke back massage on dialysis patients showed that performing the superficial back stroke massage for 10 minutes (three days a week for four weeks) during dialysis can relieve fatigue caused by dialysis. Bagheri Nesami et al. (2012) in a study with the aim of determining the effect of foot reflexology on pain and fatigue in patients after coronary artery bypass graft surgery found that there was a significant difference in terms of fatigue between the control group and the group under foot reflexology massage after intervention in the studied patients. A study in



2010 found that massage and relaxation each alone reduced perceived fatigue, but there was a difference between the effect of massage and relaxation on improving fatigue. Massage could improve muscular function after fatigue, while relaxation did not have such an effect, and massage was a more effective factor in improving fatigue than relaxation (Ghasemi et al., 2010).

To explain the role of massage, it can be said that the use of massage can most likely increase relaxation and reduce pain by increasing the secretion of endorphins. The mechanical pressures of massage stimulate the parasympathetic nerve and thus reduce heart rate, lower blood pressure; increase sedative hormones such as endorphins and serotonin, and gaining more relaxation and concentration after massage can be one of the important reasons for reducing the intensity of pain and fatigue (Crosman et al., 1984; Fraser & Kerr, 2009; Moeini et al., 2001). Massage also increases blood flow and oxygen supply by affecting the musculoskeletal system. Increased blood flow to the massaged area improves nutrition and increases the excretion of waste products, including lactic acid, which leads to energy release and fatigue relief (Soltanzadeh et al., 2002).

Massage may also stimulate the release of endorphins and enkephalin, which are natural pain relievers and mood enhancers (McCabe, 1996). Some parts of the body, including the fingers and toes, are sensitive to touch and pressure because of the receptors they have, since there are so many nerve receptors that transmit tactile impulses to the brain. The message then travels back through the ganglia, nerve cord, and motor neurons to the muscle groups, and massage accordingly affects the body and muscles, causing them to relax and become comfortable (O'Rourke et al., 2002). It can be said that massage affects fatigue of muscles. On the other hand, this technique can be indirectly effective in improving depression by reducing pain, and creating

relaxation and improving sleep (McCabe, 1996). Serotonin and dopamine are two neurotransmitters of biogenic amines that are most involved in the pathophysiology of mood disorders. The levels of these neurotransmitters appear to decrease in mood disorders such as depression. In addition, in the case of cortisol levels, it appears to increase the level of this neurotransmitter (Sturgeon et al., 2009). In fact, massage can reduce the release of stress hormones (cortisol) in the body and boost the transfer of the hormone's serotonin and dopamine, which are needed to calm the nerves (Hernandez et al., 2004). Since the findings of the present study were consistent with the findings of many other researchers (Vafamand et al., 2013; Field et al., 2012; Roozbayani, 2010; Field et al., 2005; Yi-Ching & Tsay, 2004; Susie et al., 2007; Hernandez et al., 2004), it seems that it can be concluded that massage therapy plays an important role in improving mood. The reason for the good effect of massage on improving mood is probably nervous irritability, increased parasympathetic activity and decreased cortisol levels. On the other hand, massage increases the levels of dopamine and serotonin and as a result, the person feels relaxed and their mood improves (Ghasemi et al., 2012).

4-1. Conclusion

Finally, it is recommended to female rowing coaches to use effleurage massage with exercises in order to decrease fatigue and improve mood in athletes. Given that intensive training can increase athletes' pain and fatigue and lead to a decrease in their athletic performance and also sports camps and intensive training due to increased fatigue and being away from the family can decrease the mood and mental state of athletes, massage therapy can be helpful in this regard and can be used as a complementary intervention to prepare female rowers.

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اثر ماساژ برخستگی و حالات خلقی بانوان قایقران

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چکیده: هدف از پژوهش حاضر، بررسی تاثیر ماساژ برخستگی و حالات خلقی بانوان قایقران بود. از طرح شبه آزمایشی پیش آزمون-پس آزمون با گروه گواه برای آزمایش استفاده گردید. شرکت کنندگان در پژوهش ۳۰ نفر از بانوان قایقران استان تهران بودند که بصورت داوطلبانه مشارکت کردند. نمونه داوطلب به طور تصادفی به دو گروه آزمایش و گواه (هر گروه ۱۵ نفر) واگذار شدند. برای هر دو گروه پیش آزمون صورت گرفت. سپس آزمودنی های گروه آزمایش در ۱۲ جلسه ماساژ زیر نظر متخصص ماساژ شرکت کردند. ضمناً هر دو گروه به تمرینات عادی قایقرانی خود نیز ادامه می دادند. بعد از پایان مداخله، برای هر دو گروه پس آزمون انجام شد. از مقیاس فشار و سختی ادراک شده و مقیاس خستگی، پرسشنامه حالات خلقی و پرسشنامه محقق ساخته برای سنجش متغیرها استفاده شد. از آزمون آماری تحلیل واریانس با اندازه گیری مکرر برای آزمون فرضیه ها بهره گرفته شد. نتایج نشان داد که شدت درک شده و خستگی در گروه ماساژ در مقایسه با گروه کنترل به طور معنادار کاهش یافته است ($P < 0/05$). همچنین، خشم ($P = 0/002$)، گنجی ($P = 0/002$)، افسردگی ($P = 0/028$)، خستگی خلقی ($P = 0/015$)، و تنش ($P = 0/039$)، در گروه ماساژ در مقایسه با گروه کنترل به طور معنادار کاهش یافتند. نیرو در گروه ماساژ در مقایسه با گروه کنترل به طور معنادار افزایش یافت ($P = 0/008$). نتایج در مجموع حاکی از آن بود که ۱۲ جلسه ماساژی تواند برای کاهش خستگی و بهبود حالات خلقی بانوان قایقران مورد استفاده قرار گیرد.

واژه های کلیدی: ماساژ؛ حالات خلقی؛ خستگی؛ قایقرانی؛ افسردگی؛

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این نماد به معنای مجوز استفاده از اثر با دو شرط است یکی استناد به نویسنده و دیگری استفاده برای مقاصد غیرتجاری.