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The Effect of Pilates and TRX Exercises on Non-athletic Women's Mood

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ABSTRACT

The purpose of this study was to investigate the effects of Pilates exercises on the mood of non-athlete women. 45 non-athlete women aged 20 to 40 from the selected clubs in Tehran, who enrolled in sports classes and were randomly selected and randomly assigned into 3 groups of 15 trainees (TRX) (n = 15), Pilates (n = 15) and control group (n = 15). In this research, the bromus logbook (Lin et al., 2007) was used as a tool. Participants in experimental groups were intervened in 12 sessions of 60 minutes in 6 weeks. One-way ANOVA and Shafa's post hoc test were used to analyze the data. The results showed that there is no significant difference between the variations average of stress (p = 0.053), depression (p = 0.961), anger (p = 0.252), vitality (p = 0.340), fatigue (p = 0.611), confusion (p = 0.988), relaxation (p = 0.203), happiness (p = 0.67), TRX and non-athlete female and control exercising groups. It is suggested that more research is done on larger samples so that the results can be expanded with certainty.

INTRODUCTION

Today, the importance of health in two aspects of physical and mental attention is considered by researchers in different areas. The concept of sport (exercising) is one of the most important areas in this range. Many studies have shown that sport, in addition to being a valuable tool for maintaining physical health, has a close relationship with mental health and, in particular, the prevention of mental disorders (Farahani, 2013). Regular physical activity reduces mental health and reduces stress, anxiety and depression, and it can also help prevent and control hazardous behaviors, such as smoking, alcohol or other, inappropriate diet or violence, especially among children and young people (Farahani, 2013). People who participate in fitness and sports programs believe that their workplace performance is improving and their attitudes toward issues around them get better. For example, they make fewer mistakes and can better control their weight with the will and have a better appearance (Farahani, 2013). The effect of physical activity on reducing depression and increasing the quality of life and self-esteem has also been reported (Ikuyo, 2011). Many studies have shown the relationship between sport and quality of life that exercise can have a positive effect on individuals' physical performance (Park, Han, & Kang, 2014). What is certain is that exercise can reduce depressive mood and behavior in different individuals.

It is clear that both aerobic exercise and anaerobic exercise can reduce depression and increase positive mood states in the normal population and clinical population (Farahani, 2013). Participating in sports activities helps to socialize and acquire skills and competency as well as dating and healthy relationships with peers (Farahani, 2013) (Weinberg and Gould, 2011; Translation of Vaez Mousavi et al, 2014).

Researchers say that doing physical activity can also be a shield and a shield against stress. This may be due to the effect of exercise on the immune system. Exercise increases the activity of anti-blinds (immune cells) and causes the increase of T-type lymphocytes (white blood cells) that are anti-blind and identify the location of antigen production. This helps us to eliminate the dangers of antigens before they have the chance to harm our bodies (Wilmur & Castile, 2006; Translation of Moeini et al, 2004). It is noteworthy that exercise and anxiety both secrete adrenaline and other hormones and still have a positive effect on heart function while stress causes damage to the heart tissue. In this regard, one hypothesis is that in order to have beneficial effects of adrenaline, it should be activated and released gradually (such as slow running), until it is metabolism conducted in a different way. In stressful situations and conditions, adrenaline may be severe, high and chronic, and may be harmful to the body. Although research suggests that exercise may be a barrier to stress, the available evidence for exercise effectiveness is somewhat complex and different (Khaki and Shabani, 2013). It is noteworthy that during the intensive sports activities the level of endorphin hormone increases, and as a result, athletes feel pleasure and relaxation after exercises (Khaki and Shabani, 2013). As a result of regular exercise, the amount of blood flow in the brain has increased; the nervous transducers (light epinephrine, endorphins, serotonin, etc.) have been altered in the brain; Oxygenation is maximized to the neural and brain tissues, muscle tension has been reduced, number and depth of

respiration and structural have been changed in the brain (Farahani, 2013). Increasing blood flow improves the oxygenation and nutrition of the neurons in the brain and prevents narrowing of the vasculature. Sports exercises also release a growth factor called B.D.N.F which can resist neural cells against damage and prevent significant Alzheimer's and Parkinson's disease (Wilmur & Castiel, 2006; Translation of Moeini et al., 2004). Catecholamines are a group of chemicals such as norepinephrine, epinephrine and dopamine that act as a chemical transporter. Norepinephrine and dopamine affect learning and memory. Regular exercises increase the secretion of these compounds and increase their amount in the blood plasma; therefore, exercising regularly can increase the secretion of chemical transducers, enhance memory and mood changes (Wilmur & Castiel, 2006; Translation of Moeini et al., 2004).

One of the most important psychological components influenced by physical activity is the creation of the body. The poem refers to those psychological properties that originate in more than heritable physiological processes. Some scholars believe that mood is an emotional and emotional empowerment that is saturated with instinctive tendencies and gives a favorable or undesirable aspect of the psychological state; so, the mood is related to the irritability of the brain every day, the autonomic nervous system, and the intradermal device (hormone). Creation of the dominant emotional state is considered at any time. Most scholars have created the mood for that state of affairs that usually persists and affects the overall experience of the individual, which in fact calls this state a mood (Pourafkari, 2013). Consequently, while excitement is a short-term reaction, mood is a stable state, whether reactive or intrusive, which is used to express reactions to events that are associated with a particular type of emotion (Pourafkari, 2013). Terry, Lane, Fogarty (2005) considered as a set of ephemeral emotions that, in terms of severity and duration, is usually longer than the

excitement, and they consider it a factor in intervening in evaluating and interpreting a psychological situation and how it functions in the past, present and future. One of the most important variables that is considered in sports psychology as an effective factor in sports performance and in order to better and more accurately predict the performance of athletes, and mood conditions that include a set of depression, tension, anger, fatigue, vitality, confusion, happiness, and calm (Terry, Lane, Fogarty, 2005). One of the sporting techniques that have been widespread in recent years by sports and rehabilitation specialists is the Pilates Exercise. Pilates is one of the sports that has been launched recently in the country and has been taken into consideration (Taghdisi, Mir Bagher Ajorpaz, Torabiyani, Sedaghati, 2014). Pilates refers to a series of specialized sports exercises that affect the body and mind and, while enhancing the strength and endurance of the entire body, targets the deepest muscles of the body. Pilates exercises are trying to focus your thinking and tone on the muscles of the body and how and how they work. In the meantime, with repeated movements of movements, the human mind understands the body better and makes it more powerful and balanced. Pilates also targets the muscles and joints involved in daily activities such as sitting, walking, carrying, bending and straightening, Pilates exercise exercises are correctly recorded for daily movements. Pilates trains the sporting activities in a way that prevents sports injuries. The name of this sport was originally named after the Joseph Pilates Body Control Science, which became popular after his death due to respect and memorization by his survivors Pilates (Mirza-Khaniyan et al, 2015). Other traditional activities of today can be referred to as TRX. TRX is also sporty with sporty sketching and a unique design of the parachute jumper, plus two knobs and a hook that is placed at the top of the strap. TRX is a developing sport that has been introduced in 1990s and since 1990. In this sport, people use exercises that are closed to a ceiling or

wall, exercises that are based on body weight and sometimes balance. These exercises will make the body more energy-intensive than many other sports. Improving muscle endurance is one of the positive points in this training system, while the blind muscles can also be strengthened properly. TRX Exercises, in addition to increasing the amount of energy consumed, makes the person equilibrate and muscular in a decent position which ultimately leads to pushing leads to a suitable physical condition and hence to appropriate and positive mental conditions (Arefiniya, 2015). Rashidi et al (2013) showed that doing eight weeks of Pilates exercises reduced depression and increased the quality of life of depressed women; and also Tinto, Campanella, Fassano (2016), in surveying four weeks of TRX exercise with green tea supplement have found a positive and significant effect on health and wellness indices in elderly women. Physical exercise is one of the basic needs of everyday life of man. The effects of various Pilates exercises and the like can include releasing the key hormone that is effective in feeling good (such as serotonin), relaxing in the body, reducing cortisol (stress hormone), reducing fatigue, and increasing confidence; values and benefits of exercise is not limited to physical activity, but it also works in mental health and mental health. In this regard, Omid Ali (2016) in examining the impact of Pilates exercise on the quality of life in women; Tinto, Campanella, Fassano (2016) in the effect of TRX exercise with green tea supplement on health and healthy indices of elderly women; Gajibey and Dashpand (2013) in the effect of pilates exercise and common treatments on upper organs and women's quality of life; Park, Han and Cong (2014) in the effect of sports programs on signs of depression, quality of life and self-esteem in the elderly; Leopoldino et al (2013) in the effects of Pilates on the quality of sleep and quality of life of the unpopular population and Ahadi et al (2013) have examined the effects of aerobic exercise and yoga practice on anxiety, depression and quality of life in

patients and etc. According to previous research, it seems that exercising, especially exercises emphasizing the role of the mind in the body, such as yoga, Pilates, etc., can have a healthy effect on women's health. Regarding previous research, it seems that more of the artwork in communication research has been surveyed separately and in experimental studies, it was reviewed with interventions such as aerobic and anaerobic physical activity, yoga or just Pilates, and especially on patients, and less research on the psychological factors of non-athlete women with effective mental and physical exercise interventions. So doing a research that can look at the creativity in a coherent way is essential for considering the importance and support of universal sport in the women's sector through effective interventions of different types of sports such as Pilates and TRX, which have done very little research on it within the country. Therefore, the present study aimed to investigate the effect of Pilates exercises on the non-athletic women's mood.

MATERIALS AND METHODS

Research plan and participants:

The method of this quasi-experimental study was to determine the applied and random nature of the subjects in the experimental and control groups, along with pre-test and post-test. The data were collected by field. The statistical population of this research included all non-athlete women aged 20 to 40 years old in selected clubs of Tehran in 1395 who enrolled in general sports classes. 45 non-athlete women were selected as target group and randomly divided into 3 groups of 15 persons for Pilates exercises ($n = 15$), TRX training ($n = 15$) and control group ($n = 15$). The criterion for entering the research into the participants was to obtain an average score in the mood test (mood confluence).

Tool

In this research, a personal information sheet, a company's consent form, and a brome-friendly status log (Lin *et al.*, 2007) were used as tools. The Brunswick state of

affairs questionnaire has 33 status profiles, prepared and standardized by Lane *et al.* (2007). In this test only temporary and unstable mood feelings can be measured and can be used to measure the moody conditions of one week ago, today and now. This test evaluates eight mood factors including depression, tension, anger, fatigue, vitality, confusion, calmness and happiness. These scales are of the Likert 5 option. 32 questions and measures 8 sub-scale (agents). Each subscale has 4 questions Also, vitality, tranquility and happiness (a total of 12 questions) and positive aspects of mood and stress, depression, anger, fatigue and confusion (a total of 20 questions) and negative aspects of mood in the Bromes questionnaire are 32 questions. Each question has 5 options: nothing, little, moderate, pretty much and very much. Each option ranges from 0 to 4, so that the first option, in no way indicating the lack of that state of creation, is zero, and in the next options that are added to its severity, they are given 1 to 4 points, respectively. As a result, the minimum score in the mood questionnaire is 0 and his maximum score is 128. This questionnaire in Iran was validated on 423 male and female athletes at various skill levels and 10 individual and group disciplines with an internal consistency of 0.78 and a reliability of 0.88 (Farrokhi, Motaharei, Zeidabadi, 2013).

Procedure

Following the necessary coordination (getting a reference from the University's research and coordinating with the officials and coaches of selected clubs in Tehran), a referral and familiarization meeting was held. After the briefing and referrals, a sample was selected based on the criteria. The criterion for entry of participants to this research was complete physical well-being, as well as a mean-to-high score (mood confluence). In the pre-test, the initial information was field-mediated by distributing the questionnaire and doing the test among the participants. After selecting, participants were randomly assigned into

three experimental groups (Pilates and TRX) and control group. Prior to the intervention, the purpose of the research and the instructions for conducting the research was explained by the researchers to the participants, and they were assured that all the information obtained from the research was kept confidential. They were also given the discretion to discontinue their work at any stage of the research for any reason not willing to continue to cooperate. The researchers provided the possible environmental conditions for practicing participants. In order to meet all the ethical and value aspects of the research, the researchers, having received the consent form, have respected ethical principles based on the Helsinki-Tokyo treaty as far as possible on human clinical research.

The method of intervention was such that the participants in the testing team paid the Pilates and TRX training and practice at the time of their training club.

Experimental groups trained in Pilates and TRX coaches for six weeks in 12 sessions of 60 minutes (2 sessions per week) (Bowley, Quibbay, 2016) (Tables 1 and 2).

During this period, the control group did not perform other physical and mental exercises except its usual activity.

After completing the intervention sessions, the information was retrieved from the questionnaire by post-test. In this research, descriptive statistics were used to calculate abnormalities, to determine the central indices, to disperse, to draw tables and graphs, and to inferential statistics, one-way ANOVA and SHAFEH follow-up tests were used to test the hypotheses.

It is worth noting that all the analyses were performed at the level of 0.05 using SPSS software version 22 on the pre-post-test difference score.

Table 1: Pilates Practice Intervention Protocol

Pilates exercises include simple movements that involve most of the trunk muscles (transverse abdominal wall, inner and outer quadrants, diaphragm, lumbar spinal cavity, sphincter cavity, deep spinal deformities, spinal cord involvement) and standing in three positions, sitting, sleeping, and without the need for special equipment on the mattress. The exercises started from the low level and gradually progressed. At the beginning of the sessions, a full explanation was given to the participants to get acquainted and correctly handled the movements. Exercises were conducted including the basic exercises, body examinations (pelvic and spinal cord), proper sitting position (while practicing knees, smooth upper, head and neck in one direction), proper breathing (performing deep abdominal breathing while exercising), how to do the exercises (smooth movements and shrinkage of all the muscles involved in the movement), the main Pilates exercises include the correct way of standing, warming up and tensile movements, Pilates breathing, Slow down each floor to the ground and schedule a level one movement including rising with a rounded back, a single circle, a complete cradle, a single stretch, a stretch of two legs, a stretch of the vertices to the front, ... and cool down (Omid Ali, 2016; Leopoldino et al, 2013).

Table 2: Practice TRX Intervention Protocol (TRX)

At first, the general information and basic principles of the RT-X exercises were given to the participants, such as body positioning, waist circumference, grips and angle of the arms, obstruction of the gangways, bans on sticking to strap, neutral points, adjustment of severity, etc. At the beginning of each warm-up session and stretching were conducted (about 5 minutes), then TRX exercises (about 50 minutes) were performed including (movements between the trunk, Suspension Training, TRX Squat, TRX Balance Lunge, TRX Chest Press, TRX Overhead Back Extension, TRX Mid Row, TRX Kneeling Roll Out, TRX Biceps Curl, TRX Hamstring Curl, TRX Y Deltoid Raise, TRX Standing Hip Drop, TRX Side Plank, TRX Swimmer Pull, TRX Torso Rotation, Sling exercises and ...) by rotation in each session between the lower extremities, between the trunk and the upper extremity, as well as stretching and cooling the TRX (relaxation) and returning to the initial state at the end of each session (about 5 minutes) (Arefiniya, 2015). In each session, in addition to the previous session exercises, new exercises were added. Each move was proportional to each session for 45 seconds and its rest was 30 seconds.

RESULTS

Table 3 shows the state of mood, stress, depression, anger, vitality, fatigue, confusion, serenity and happiness in the

three groups TRX, Pilates and controls in the pretest, posttest and based on the pre-post difference score.

Table 3: Describing the mood variable

Variable	Groups	Pretest		Posttest		Prepost-posttest differential score	
		M	SD	M	SD	M	SD
Stress	TRX	0.82	0.6	0.41	0.7	-0.41	0.6
	Pilates	1.01	0.7	0.85	0.7	-0.16	0.3
	Control	0.41	0.5	0.48	0.3	0.06	0.5
Depression	TRX	0.45	0.4	0.23	0.4	-0.22	0.4
	Pilates	0.86	0.6	0.68	0.6	-0.18	0.5
	Control	0.50	0.6	0.33	0.2	-0.16	0.6
Anger	TRX	0.73	0.6	0.33	0.4	-0.39	0.5
	Pilates	0.71	0.4	0.58	0.4	-0.13	0.5
	Control	0.40	0.3	0.25	0.3	-0.15	0.3
Liveliness	TRX	2.80	0.6	3.25	0.5	0.44	0.7
	Pilates	2.33	0.9	2.46	0.7	0.13	0.6
	Control	3.15	0.7	3.3	0.4	0.15	0.5
Tiredness	TRX	0.38	0.3	0.27	0.3	-0.10	0.4
	Pilates	0.80	0.6	0.53	0.6	-0.26	0.5
	Control	0.40	0.4	0.30	0.2	-0.10	0.6
Confusion	TRX	0.54	0.5	0.26	0.4	-0.27	0.5
	Pilates	0.86	0.5	0.61	0.6	-0.25	0.5
	Control	0.33	0.7	0.08	0.12	-0.25	0.7
Relaxation	TRX	2.47	0.8	2.69	0.8	0.22	1.2
	Pilates	2.03	0.7	2.2	0.8	0.16	0.5
	Control	2.83	1.1	2.46	0.6	-0.36	0.9
Happiness	TRX	3.29	0.6	2.58	0.8	0.70	0.9
	Pilates	2.73	0.5	2.58	0.8	0.70	0.9
	Control	2.93	0.4	2.88	0.8	0.05	0.7

The results of the Shapiro-Wilk test showed that the distribution of mood data, depression, tension, anger, fatigue, vitality, confusion, relaxation, and happiness do not have normal distribution. Since most of the variables data have a normal distribution, the bootstrap confidence intervals were used to stabilize the statistical test against natural assumptions breaks.

Table 4 shows the results of variance analysis of mood, tension, depression, anger,

vitality, fatigue, confusion, calmness and happiness.

The results showed:

There is no significant difference between the components of Stress ($p = 0.053$), depression ($p = 0.961$), anger ($p = 0.252$), liveliness ($p = 0.340$), tiredness ($p = 0.611$), confusion ($P = 0.988$), relaxation ($p = 0.203$), happiness ($p = 0.067$) in TRX, Pilates and control groups in non-athlete women.

Table 4: One-way variance analysis results for component of stress, depression, anger, liveliness, tiredness, confusion, relaxation, happiness

Source	SS	Df	MS	F	Sig
Intergroup	1.82	2	0.914	3.15	0.053
In-group	12.7	44	0.290		
Total	14.5	46	-		
Intergroup	0.025	2	0.012	0.039	0.961
In-group	13.7	44	0.313		
Total	13.77	46	-		
Intergroup	0.710	2	0.355	1.42	0.252
In-group	10.9	44	0.249		
Total	11.67	46	-		
Intergroup	0.97	2	0.488	1.10	0.340
In-group	19.4	44	0.441		
Total	20.3	46	-		
Intergroup	0.278	2	0.139	0.498	0.611
In-group	12.2	44	0.279		
Total	12.5	46	-		
Intergroup	0.009	2	0.005	0.012	0.988
In-group	16.9	44	0.386		
Total	16.9	46	-		
Intergroup	3.24	2	1.62	1.65	0.203
In-group	43.1	44	0.981		
Total	46.4	46	-		
Intergroup	3.43	2	1.71	2.88	0.067
In-group	26.1	44	0.595		
Total	29.5	46	-		

Shafeh post hoc test was used to determine the source of the differences and the results of this test with bootstrap intervals showed:

- (TRX and control group [0.92,-0.02] BCa 95% CI); (Pilates and control group [0.5, -0.13] BCa 95% CI); (TRX group and Pilates [0.57, -0.11] BCa 95% CI).
- (TRX and control group [0.36,-0.3] BCa 95% CI); (Pilates and control group [0.40, -0.48] BCa 95% CI); (TRX group and Pilates [0.35, -0.32] BCa 95% CI).
- (TRX and control group [0.10,-0.58] BCa 95% CI); (Pilates and control group [0.36, -0.32] BCa 95% CI); (TRX group and Pilates [0.62, -0.11] BCa 95% CI).
- (TRX and control group [0.72,-0.19] BCa 95% CI); (Pilates and control group [0.38, -0.48] BCa 95% CI); (TRX group and Pilates [0.16, -0.71] BCa 95% CI).
- (TRX and control group [0.35,-0.40] BCa 95% CI); (Pilates and control group [0.54, -0.25] BCa 95% CI); (TRX group and Pilates [0.14, -0.46] BCa 95% CI).
- (TRX and control group [0.46,-0.52] BCa 95% CI); (Pilates and control group [0.45, -0.64] BCa 95% CI); (TRX group and Pilates [0.37, -0.31] BCa 95% CI).
- (TRX and control group [0.20,-1.4] BCa 95% CI); (Pilates and control group [0.001, -1.1] BCa 95% CI); (TRX group and Pilates [0.70, -0.78] BCa 95% CI).
- (TRX and control group [0.001,-1.2] BCa 95% CI); (Pilates and control group [0.12, -0.77] BCa 95% CI); (TRX group and Pilates [0.29, -0.82] BCa 95% CI).

DISCUSSION

The purpose of this study was to investigate the effects of Pilates and TRX exercises on non-athletic women's mood. The results of the analysis showed the findings on the variable of mood; There is no significant difference between the

components of Stress (p = 0.053), depression (p = 0.961), anger (p = 0.252), liveliness (p = 0.340), tiredness (p = 0.611), confusion (P = 0.988), relaxation (p = 0.203), happiness (p = 0.067) in TRX, Pilates and control groups in non-athlete women. The results are consistent with the findings of Sadr al-

Ashrafi et al (2010) and With Kamali, Mahdavi Nejad, Nowruzi (1395), Bahram, Pour Vaghar, Akashesh (1393), Ghodsi, Mir Bagher, Torabian, Sedaghaty (1393), Ahadi et al (2013), Mohammadi Dinani, Nezakat al-Husseini, Esfarjani, Etemadifar (1392), Sezbo (2003) except for tiredness and liveliness were incompatible. Many factors, such as genetics, nutrition, weather, smell, music, physical activity, and light, can be said to affect the mood. Among these factors, physical activity, along with other benefits, plays an important role in improving the mood of people, but the association between physical activity and mood is also complicated. Researches show a positive and significant correlation between physical activity and mood and believe that higher levels of physical activity can prevent a certain degree of clinical depression (Lepamaki, 2006). Research suggests that physical exercise under different circumstances has different effects on mood and is useful in improving the mood and maintaining it at a high level; while heavily healing exercises are effective in disrupting mood and increasing depression in relation to anxiety (Ploso et al, 2007).

There is an inverse relationship between the anabolic state (creating) and the mood, so that with the occurrence of the anabolic process, the mood is negated (O'Connor et al, 2009). When the exercise pressure is more than average and the anabolic process occurs, negative mood increases. If the exercise pressure is moderate, there is a catabolic (burning) state, which is directly related to changes in mood dimensions, that is, with the catabolic state of affairs, the improvement of the mood dimension is observed (Devan et al, 2007). Another cause of changes in cortisol levels is the correlation between cortisol levels and the activity of the nervous system, which increases the duration of exercise, stimulates the nervous system and increases cortisol secretion, it also affects neuronal function (cognitive, memory, and mood effects) (Horwitz et al., 2003). In the present study, it was observed that none of the mood

variables changed. Probably there are the time and intensity of exercise due to the lack of participants' athletic experience and, on the other hand, the limitations that exist in our society among women and the existence of various stresses in today's life may have affected the activity of the nervous system, and hormonal changes on the other hand have been influential in this regard (Lavallo, 2006). Increased cortisol concentration was reported before and after the 90-minute practice of muscular movements after eight weeks (Lac & Chamoux, 2006). Physical activity increases the central body temperature and decreases pH, which facilitates the release of the hormone from the carrier proteins. Cortisol is one of the stress hormones which is released in response to the stresses on the organism. It seems that this research is one of the stressors in this research that has a psychological mechanism and increases cortisol concentration (Sadr al-Ashrafi et al, 2010); therefore, there was no significant effect on mood factors. So, we conclude that Pilates and TRX exercises did not have a significant effect on the mood of non-athlete women due to the duration, severity and physiological factors and the unstable factor of the creativity; therefore, it is suggested that more research is done on larger samples so that the results can be expanded with certainty.

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