European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

DOI: 10.46827/ejpe.v6i8.3452 Volume 6 | Issue 8 | 2020

EFFECT OF PROGRESSIVE MUSCLE RELAXATION AND B COMPLEX CONSUMPTION ON BLOOD PH AND BLOOD INFECTION CHANGES CAUSES OF ANXIETY

Neysi Fatemeh[1i],
Zourmand Gholamreza[1],
Iryna Skrypchenko[2],
Olena Dorofieieva[3],
Kseniia Yarymbash[3]
[1]Deparment of Physical Education,
Ahwaz Branch, Islamic Azad University,
Ahwaz, Iran
[2]Deparment of Physical Education,
Dnipropetrovs'k State University of Internal Affairs,
Ukraine
[3]Department of Physical Rehabilitation and Sports Medicine,
Bogomolets National Medical University,
Ukraine

Abstract:
With regard of the relationship and effect between body and mind, especially on some of the immune system's factors, it is essential to examine the effects and how they are controlled. The purpose of this study was to examine the effect of eight weeks of progressive muscle relaxation and B complex consumption on blood Monocyte, lymphocytes, PH changes result of anxiety. The statistical population of this study was students in secondary school. The sample consisted of two groups of 15 (experimental and control group) who were selected randomly. Tools included a biofeedback device (GSR) to test the level of anxiety and the SPO device (CBC) to measure blood factors. The training groups done programs for 8 weeks, three session and 40 minutes each session and done 4 set, they exercised under the supervision of the researcher and consuming 100mg of B-complex every day. After 8 weeks, biochemical tests and anxiety tests were repeated again. Results showed eight weeks progressive muscle relaxation with B complex consumption have significant effect on blood monocyte, lymphocytes, PH causes by anxiety. As regarding the significant improvement of safety indexes after relaxation exercises and consumption B complex, it is recommended that athletes and people to reduce their dangerous immune system symptoms use the methods of results in the present study.

[i] Correspondence: email sit71@ukr.net

Keywords: anxiety, relaxation, B complex, infection, blood PH

1. Introduction

One of the topics that are widely studied in psychology today is the role of emotions. Anxiety can greatly affect a person's performance. Therefore, understanding anxiety, its process and effects is essential (Boyume et al., 1996). However, humans have a some of anxiety that has spread from the lowest to the highest. Therefore, it is necessary to pay attention to the importance and scope of the issue (Chen et al., 2008). A little of anxiety in humans is normal and desirable and increases effort and endeavor, but if it exceeds the limit of moderation will reduce performance (Bastani et al., 2005). Anxiety can lead to decreased performance in complex mental work. It may lead to irrational choice or it may lead to withdrawal of the person from situations that are anxious (Haeri, 2011). There are several ways to reduce anxiety, one of which is relaxation. Muscle relaxation was introduced and used in 1938 by Jacobson as a complementary therapy to reduce anxiety. This method, while having a positive effect, is very easy to learn and can be considered as a complementary treatment. Relaxation is used as an effective treatment for stress and anxiety disorders (Martini et al., 2010). Hippocrates believes that relaxation dramatically alters the activity of the autonomic nervous system. As a result, it affects the patient's physiological response to stress (Lewis et al., 2013). Therefore, it seems necessary to study the changes, effects and relationship between body and mind on each other, so the researcher intends to study these changes and the effects of body and mind on each other, especially on changes in the immune system.

2. Material and Methods

In this study, the statistical population of all female high school students in the city of Susangard, without a history of diabetes, cardiovascular disease, overweight and any disease that affects the factors studied. The statistical sample of this study includes 2 groups of 15 people (experimental and control) that are randomly selected in clusters.

Tools to this study were:

- Galvanic Skin Respon (GSR) biofeedback device to test anxiety.
- Sysmex KX21 SPO device (cell counter device) for blood test performed by the laboratory.
- Beck Anxiety Questionnaire.

This research was experimental and applied. to examine anxiety use Biofeedback tool (GSR). Demographic information was then collected using a researcher-made questionnaire regarding age, marital status, education, history of drug use, history of disease and physical activity status. Then, according to the information obtained from the demographic questionnaire, 30 of them were selected randomly cluster and divided into 2 groups (exercise and control). After performing biochemical experiments, the training groups practiced under the supervision of a researcher for 8 weeks. The control

group was also prohibited from exercising regularly during these 8 weeks. After 8 weeks, biochemistry and anxiety tests were repeated from the research units and the obtained data were analyzed by a statistical expert. In the training groups, Jacobsen method of relaxation (progressive muscle relaxation and deep breathing) was taught and performed in groups. 24 relaxation sessions were performed for 8 weeks and each session lasted for 40 minutes (3 sessions per week). The training program in each session included introducing the muscles, teaching the steps of performing the progressive relaxation technique in the form of explanation and practical demonstration, answering the subjects' questions about the relaxation technique and how to perform the technique. In each session, the relaxation technique was performed by the subjects together with the researcher and the necessary explanations and corrections were provided. Relaxation was then performed by the subjects under the supervision of the researcher. In relaxation, patients were asked to contract and relax each muscle from the soleus to the facial muscles, which includes 16 muscles. Subjects contracted their muscles by counting to 5 and then relaxing by counting to 10. Repeat the same steps for the legs and feet, thighs, abdomen, chest, buttocks, arms and forearms, arms, shoulders, neck, forehead, tongue and jaw, eyes and face until you feel their whole body is loosely integrated. At the same time, the subjects breathed deeply copper during relaxation. The selected position for gradual relaxation is lying down. Relaxation exercises were performed by the experimental group for 40 minutes for 8 weeks. The time Jacobsen suggested for relaxation exercises was several sessions of 30 to 60 minutes a week with long follow-up of up to a year. In the relaxation exercise group with vitamin B complex, the subjects used 100 mg of vitamin B complex daily. There was no intervention in the control group. All data collected by the research were processed by descriptive and comparative statistics. From the space of descriptive statistics, the arithmetic means, and standard deviation were calculated for each variable, while the T-test used to determine the differences. The statistical program for personal computers SPSS for Windows-version 20.0 was used for data processing.

3. Results

Table 1 represent the results of Correlated t-test of effect of eight weeks progressive muscle relaxation exercises with B-complex consumption on blood lymphocytes, monocytes and PH causes by anxiety. According to the results it could seen ($p<0.05$) significant different between experimental group in pre-post test ($p=0.001$) of amount of blood lymphocytes. In results seen significant different between experimental group in pre-post test ($p=0.003$) of amount of blood monocytes. In results seen significant different between experimental group in pre-post test ($p=0.006$) of amount of blood PH.

Table 1: Correlated t-test results of blood lymphocytes, monocytes and pH causes by anxiety in pre-post test

Variables	Group	Step	Mean ± Std.Dev.	t-value	p
Lymphocytes	Experimental	Pre test	2626.2±210.25		
		Post test	2312.1±186.23	5.69	0.001
	Control	Pre test	2640.8±120.12	0.97	0.18
		Post test	2631.4±148.12		
Monocyte	Experimental	Pre test	150.44±41.86		
		Post test	132.69±72.53	4.51	0.003
	Control	Pre test	154.10±37.12	0.75	0.41
		Post test	158.23±42.37		
PH	Experimental	Pre test	7.06±0.09		
		Post test	7.46±0.10	5.12	0.006
	Control	Pre test	7.04±0.08	0.94	0.38
		Post test	7.12±0.11		

Table 2 show the results of t test of post test of effect of eight weeks progressive muscle relaxation exercises with B-complex consumption on blood lymphocytes, monocytes and PH causes by anxiety in experimental and control groups. There was significant different between experimental and control in post test in blood lymphocytes (p=0.001). There was significant different between experimental and control in post test in blood monocytes (p=0.01). There was significant different between experimental and control in post test in blood PH (p=0.012).

Table 2: T-test results of blood lymphocytes, monocytes and PH causes by anxiety in post test

Variables	Group	Mean±Std.Dev.	t-value	p
Lymphocytes	Control	2631.4±148.12	5.86	0.001
	Experimental	2312.1±186.23		
Monocyte	Control	158.23±42.37	4.43	0.01
	Experimental	132.6972.53		
PH	Control	7.12±0.11	4.60	0.012
	Experimental	7.46±0.10		

4. Discussion

The purpose of this study was to examine the effect of progressive muscle relaxation and B complex consumption on blood Monocyte, lymphocytes, PH changes causes by anxiety. In consideration of the different between blood Monocyte, lymphocytes, PH changes in pre and post test significant different were found.

There are other studies in agreement with the results of our study relation between muscle relaxation, B complex consumption and blood Monocyte, lymphocytes, PH changes causes by anxiety. The researchers (Carthy et al., (2017), Nieman, (2012), Dabidi et al., (2010), reported a decrease in safety factors in their research, which is in line with the present study. In a study investigated the effect of one and two sessions of combined endurance-resistance training on redistribution of leukocyte subtypes of male athletes

that the results showed a significant increase in neutrophils and lymphocytes at intervals of one and two It was a training session, which is not in line with the present study, but the number of monocytes in most of the time intervals after training has not changed significantly, which is inconsistent with the present study. The difference in the intensity of the exercises performed can be a reason for this difference (Arazi et al., (2008). After prolonged and intense training, features appear in the immune system that are accompanied by the destruction of cellular immunity and increased inflammation. Thus, the lymphocyte concentration decreases and the innate immunity, lymphocyte proliferation, and salivary IgA secretory levels of IgA immunoglobulin A stop. Gentle exercise throughout life seems to increase resistance to infections of the body's organs. Conversely, repeated strenuous exercise can impair immune function. Overall, athletes are advised to consider nutritional strategies in the recovery phase to correct exercise-induced immunosuppression (Jafari et al., 1993). In confirmation of this issue, Yadegari et al., (2017) examined the effect of a session of progressive and intense periodic aerobic activity on the number of leukocytes and blood platelets in non-athlete men. Before, immediately and two hours after the activity, the number of leukocytes, neutrophils, lymphocytes, monocytes and platelets were counted. The number of leukocytes increased immediately after performing both activities. The number of neutrophils increased immediately after both types of activity. The lymphocyte count also increased immediately after both types of activity and decreased below resting levels two hours after exercise. The number of monocytes and platelets increased immediately after performing both activities. It seems that performing one session of progressive and intense periodic aerobic activity can significantly increase the amount of immune system cells and blood circulation (Jafari et al., 1993). It has also been shown to stimulate the immune system and may be somewhat responsive to disease in relation to mild exercise and physical activity. However, intense training eliminates the immunosuppression of the game and thus increases the risk of infection in athletes. During a period of intense exercise, mobilized immune system cells are created. If you have under blood, all this grace and all the lymphocytes are called into circulation. However, after strenuous exercise, the number of lymphocytes builds below the baseline, causing neutrophils to increase and persist. Also, IgA secreted by the audience is reduced. In response to acute sports activity, there has been a marked increase in anti-threat sites and before. All these factors indicate that a strong inflammatory response occurs during strenuous exercise (Yadegari et al., (2017). Therefore, physical activity and heavy exercise cause inflammation and immunodeficiency.

Medical results also show that heavy and frequent exercise will include asymptomatic clinical infections. Explain that viruses and bacteria leave traces after exercising that cause changes in the body's immunity over time. In other words, they open a window so that the infection can take root in the athlete during the period when he is more prone. The mechanisms of these events are based on several factors, including neuro-endocrine and metabolic factors. Dietary supplementation can be considered as a principle of protection against increased risk of infection during the recovery period and

after strenuous exercise. B-complex supplementation has also been shown to modulate exercise-induced immune changes. But no significant clinical evidence has been shown in this regard (Nieman, & David, 2001). In general, exercise causes microstructural damage and an inflammatory response in the form of muscle pain and swelling, an increase in the number of peripheral white blood cells (leukocytosis), accumulation of monocytes and lymphocytes in damaged muscle fibers, increased intramuscular mediators and leakage into their interstitial leaks. They become cells and blood (Nie et al., 2005). The results of some previous studies indicate that the increase in the number of peripheral white blood cells during and immediately after exercise is often due to an increase in the number of neutrophils and to a lesser extent lymphocytes. However, the number of monocytes may also increase (Pizza et al., 1995). Some researchers believe that the increase in white blood cells due to exercise is mostly due to skeletal muscle damage. Injury or trauma triggers an inflammatory response that causes neutrophils to migrate to the damaged tissue, after which monocytes begin to grow. Monocytes are transformed into macrophages to acquire the ability to xenophagous (Martini et al., 2010). There have been many studies in the field of immunology, which have examined the changes in the immune system, the result of most research is that stress affects the variables of the immune system and in the long run disrupts the immune system. The effect of stress on the immune system may be exerted by hypothalamic-pituitary peptides and the sympathetic branch of the central nervous system (Shojadin et al., 2004). The results show that stressful situations reduce the percentage of monocytes to the percentage of neutrophils and increase the number of monocytes. It also increases white blood cells and the percentage of lymphocytes, all of which are due to increased cortisol (Hamidizadeh et al., 2006).

The results of the present study showed that eight weeks of progressive muscle relaxation exercises with B-complex consumption have a significant effect on changes in blood pH due to anxiety. Eight weeks of progressive muscle relaxation exercises with B-complex increased blood pH. These results are consistent with the research of Haeri et al., (2011) who investigated the effect of sodium bicarbonate supplementation on lactate response, blood pH and aerobic and anaerobic capacity of female students of Boroujerd University. The results of this study showed that sodium bicarbonate consumption It had no effect on aerobic and anaerobic capacity of female students. Sodium bicarbonate and placebo both increased blood pH by 0.26 percent and prevented pH reduction from exercise. Ojaqi et al., (2012) in a study investigated the effect of induced alkalosis on lactate, bicarbonate, blood pH and athletic performance in skaters that the results showed a significant decrease in blood pH that is consistent with the present study. Bahari et al., (2010) investigated the effect of sodium bicarbonate supplementation on changes in blood lactate concentration, pH and anaerobic power of young taekwondo practitioners. The results showed that sodium bicarbonate consumption significantly increased changes in blood lactate levels and anaerobic capacity of taekwondo practitioners. Especially in the second place of the ergojump test. It was also observed that taking this supplement has a significant effect on the pH of the subjects' blood at different stages. Which is in line with

the present study. Acidosis stimulates the secretion of parathyroid hormone and increasing parathyroid level causes reabsorption of phosphate and reduces the capacity of the kidneys to excrete acid. Ammonia is stimulated by acidosis and stimulates the accumulation of cortisol (Dabidi et al., 2010), and helps regulate kidney function and helps control and manage stress (Mochcovitch et al., 2016) and also causes the production of certain hormones and neurotransmitters that lead to the control of stress and anxiety. It can control hyperthyroidism and subsequent increase in parathyroid levels (Davis, 2005).

5. Conclusions

As discussed, anxiety can directly or indirectly affect the components and function of the immune system and cause changes in the way the system works. Anxiety can be controlled and reduced by a variety of exercise techniques, such as relaxation and nutrition, such as the use of B-complex supplements, and its detrimental effects on the immune system, as well as the effectiveness of each on changes in the immune system. Intensity and duration of activity, age, sex and level of physical fitness of subjects, dose, method of sampling and measurement, time of physical activity and blood sampling depend.

According to the results of this study on the significant improvement of safety indicators after relaxation exercises and taking B-complex pills, which is due to reducing anxiety, athletes and coaches are recommended to reduce the symptoms related to the immune system, including infection. Use those whose effectiveness has been shown in the present study.

Funding
This research received no external funding.

Conflicts of Interest
The authors declare no conflict of interest.

References

Boyume, A., Wiik, P., Gustavsson, E., Veiby, O. P., Reseland, J., Haugen, A., & Opstad, H. (1996). The effect of strenuous exercise, calorie deficiency and sleep deprivation on white blood cells, plasma immunoglobulins and cytokines. *Scandinavian Journal of Immunology.* 43(2): 228–235.

Chen, H. Y., Chiang, C. K., Wang, H. H., Hung, K. Y., Lee, Y. J., Peng, Y. S., et al. (2008). Cognitive-behavioral therapy for sleep disturbance in patients undergoing peritoneal dialysis: a pilot randomized controlled trial. *American journal of kidney diseases: the official journal of the National Kidney Foundation.* 52(2):314-23.

Bastani, F., Heidarnia. A., Kazemnejad, A., Vafaei, M., Kashanian, M. A. (2005). Randomized Controlled Trial of the Effects of Applied Relaxation Training on Reducing Anxiety and Perceived Stress in Pregnant Women. *J Midwifery Womens Health.* 50(4):e36-e40.

Haeri, T., Behpoor, N., Kiwanlu, F., Pejhan, A, Kotan, M. (2011). The effect of sodium bicarbonate consumption on blood lactate pH response and aerobic and anaerobic capacity. *Journal of Zabol University of Medical Sciences and Health Services*. 3(2).

Martini, J., Knappe, S., Beesdo-Baum, K., Lieb, R., & Wittchen, H. U. (2010). Anxiety Disorders before Birth and Self-Perceived Distress during Pregnancy: Associations with Maternal Depression and Obstetric, Neonatal and Early Childhood Outcomes. *Early Hum Dev.* 86(5):305-10.

Lewis, J. E., Tiozzo, E., Melillo, A. B., Leonard, S., Chen, L., Mendez, A., & Konefal, J. (2013). The effect of methylated vitamin B complex on depressive and anxiety symptoms and quality of life in adults with depression. *International Scholarly Research Notices*, 2013.

Mac Carthy, D. A., Dall, M. M. (1988). The leucocytosis of exercise. *Sports Med*. 25:191-195.

Nieman, D. C. (2012). Clinical implications of exercise immunology. *Journal of Sport and Health Science*, 1(1), 12-17.

Dabidi Roshan, V, Hashemvarzi, S.A, Zia Fall, M. (2010). Effect of sodium bicarbonate supplementation on changes in blood lactate concentration, pH and anaerobic power of young taekwondo practitioners. *Sports Physiology.* 5 (26 consecutive).

Arazi, H, Damirchi, A., Babaei, P. (2008). The effect of one and two sessions of combined endurance-resistance training on redistribution of blood leukocyte subgroups of male athletes. 36: 107-128.

Jafari, H., Taheri, K. (1993). The effect of repeated sessions of exercise on immune cells and cortisol in female athletes. *Journal of Ilam University of Medical Sciences.* 22 (1), April.

Yadegari, M., Ravasi, A. A., Choubineh, S. (2017). The effect of a session of intense progressive and periodic aerobic activity on the number of leukocytes and blood platelets in non-athlete men. *Journal of Biological Sciences.* Spring

Nieman, D. C. (2001). Dose exercise alters immune function and respiratory infection? *President's Council on Physiol Fitness and Sports.* 3(13).

Nie, H., Kawczynski, A., Madeleine, P., & Arendt-Nielsen, L. (2005). Delayed onset muscle soreness in neck/shoulder muscles. *European Journal of Pain.* 9(6): 653-660.

Pizza, F. X., Mitchell, J. B., Davis, B. H., Starling, R. D., et al. (1995). Exercise-Induced Muscle Damage - Effect on Circulating Leukocyte and Lymphocyte Subsets. *Med Sci Sport Exer.* 27(3): 363-370.

Shojadin, S., Ibrahim, K. H., Hosseini, S. M. (2004). Comparison of some characteristics of the immune system in active and inactive elderly. *Journal of Motor Sciences and Sports*, 1 (4): 92-77.

Hamidizadeh, S., Fazlullah; A., Asghari, M. (2006). The effect of relaxation technique on anxiety and stress in the elderly with hypertension. *Shahrekord University of Medical Sciences.* 8 (2): 45-51.

Ojaqi, A., Gabriel, P., Dehghanpour, M., Sahranovard, A. (2012). The effect of induced alkalosis on lactate, bicarbonate, blood pH and athletic performance in skaters. First National Conference on Physical Education and Sports Sciences, Najafabad, Islamic, Azad University.

Bahari, M., Mirdar, S. H., Debidi, R. V., Safiri, H. (2008). Acute effect of one and two sessions of increasingly helpless training on some safety indicators in active girls. *Olympic Magazine*, 16 (2).

Mochcovitch, M. D., Deslandes, A. C., Freire, R. C., Garcia, R. F., & Nardi, A. E. (2016). The effects of regular physical activity on anxiety symptoms in healthy older adults: a systematic review. Brazilian Journal of Psychiatry, 38(3), 255-261.

Davis, M. (2005). Tutorial relaxation and stress reduction. Tehran: Tabib, 81.