



RESEARCH PAPER

OPEN ACCESS

The effect of 10-week aerobic exercises on mental health of middle-aged non-athlete universities' female staff

Mahvash Noorbakhsh^{1*}, Eidy Alijani²

College of Physical Education and Sport Sciences, Islamic Azad University- Karaj Branch, Alborz, Iran

Key words: Mental health, aerobic exercise, non-athlete, female

<http://dx.doi.org/10.12692/ijb/5.10.177-182>

Article published on November 26, 2014

Abstract

Several reports indicate that physical activity can improve mental health of people. Sound mental health of university staff is very important because they involve in training of future maker experts in each and every country in the world. Accordingly, the purpose of this study was to investigate the effect of 10-week aerobic exercises on mental health of middle-aged non-athlete universities' female staff. Statistical population of this study include all universities' female staff (N=181). 60 subjects were randomly selected and randomly divided into experimental (n=30) and control (30) groups. General health questionnaire (GHQ-28) was used to evaluate the general health and its sub-scales (somatic symptoms, anxiety, depression, social dysfunction). Pre-test was carried out and then experimental group participated in an aerobic exercise program for 10- weeks, 3 sessions per week, and each session 60 minutes. After post-test, data were analyzed by independent and dependent t-test using SPSS at significant level of $p \leq 0.05$. Results showed that there were significant differences between experimental and control group ($p < 0.01$) regarding general mental health. Findings also indicated that significant differences were observed in somatic symptoms ($p < 0.01$), depression ($p < 0.05$) and anxiety symptoms ($p < 0.01$) between experimental and control group. It could overallly be concluded that aerobic exercises improve general mental health by reducing somatic and anxiety symptoms and depression. Therefore, all forms of physical activity especially aerobic exercises are recommended to promote general mental health and its components.

*Corresponding Author: Mahvash Noorbakhsh ✉ mahvashnoorbakhsh@yahoo.com

Introduction

Several reports claim that mental disorder is one of the most important problems in many societies which can affect on different social, economical, and cultural aspects of people's life. In each society, various organizations including universities have been established with different aims and objectives in which physical and psychological health of their human resources is the main priorities (Cohen, 2009; Sharma *et al.*, 2006). Traditional treatment of this disorder is based on pharmacology and psychotherapy which can be very expensive and time consuming (Cash *et al.*, 2004; Sharma *et al.*, 2006). An essential component of lifestyle modification is physical activity. The importance of exercise and physical activity is not adequately understood by people and mental health professionals alike (Sharma, 2006). Nevertheless, many researchers have suggested that mental health and physical health are very closely tied together and each can have a significant effect on the other (Cohen *et al.*, 2009). Mental health can be positively affected by physical activity and exercise. Before examining the benefit of exercise for mental health, it is necessary to differentiate various forms of activity. There are two basic forms of exercise; aerobic and anaerobic. Most findings have suggested that aerobic activities are a useful and easy exercise for promoting general mental health (Cohen *et al.*, 2009; Hatami *et al.*, 2013). Different investigations have been conducted regarding the effect of aerobic exercises on micro scales of general mental health such as somatic symptoms, anxiety, depression and social dysfunction, through general health questionnaire (GHQ-28). Of the 25 article reviewed, only 12 directly examined the effects that physical activity or exercise has upon a person's general mental health. Relevant information from these 12 articles showed that aerobic exercise has been found to be likely the best form of physical activity for improving general mental health and psychological adjustment and micro scales such as anxiety, depression and somatic symptoms (Cohen, 2009). (Hashemi *et al.*, 2007) examined the benefit of exercise for mental health and found that exercise improves mental health by reducing anxiety,

depression and negative mood by improving self-esteem and cognitive function. (Hatami *et al.*, 2013) conducted the effect of aerobic activities on depression and anxiety symptoms and sleep disturbances of Iranian female students and their findings suggested that there were a significant differences in depression, anxiety symptoms and sleep disorders between experimental and control group. (Zarshenas *et al.*, 2013) examined the effect of short-term aerobic exercise on depression and body image in Iranian women and found that short-term aerobic exercise also caused a significant decrease in depression symptoms. (Dimeo *et al.*, 2001) investigated benefits from aerobic exercise in patients with depression and their results showed that aerobic exercise can produce substantial improvement in mood in patients with depression symptoms. (Kornreich *et al.*, 2005) investigated the impact of regular activity on physical and mental health. Their results confirmed that performing regular activity reduced mental disorders including psychological stress and anxiety. A study showed effect of exercise on anxiety and concluded that involving in physical activity caused an improvement in mood of subjects and caused a significant reduction in anxiety and depression (Gauszkowska, 2004). Considering statistics data, it can be stated that prevalence of psychological and mental disorders are increasing in the whole world including Iran (Hatami *et al.*, 2013). On the other hand, world health organization (WHO) in 2009 announced that there are more than 450 million people in the world whom suffering from mental disorders in which depression and anxiety symptoms are more common (Pezeshkan, 2009). With regard to these data and limitation of the conclusions taken from previous studies regarding the effect of training on mental health, it seems necessary and important to investigate this subject. Therefore, the purpose of this study was to survey the effect of 10- week aerobic exercises on mental health of middle-aged non-athlete females working in university.

Materials and methods

This study was an applied semi-experimental which

consist of two groups (experimental and control) with pre-test and post-test. Statistical population includes all female employees working in university in 2011 (N= 181) whom have not been involve in any regular physical activity during last 2 years. 60 subjects were randomly selected and randomly divided into experimental (N=30) and control (N= 30) groups. After coordinating with both groups, general mental health of all female staffs participating in this field study were evaluated based on general health questionnaire (GHQ-28) of Goldberg and Hiller as pre-test. This shorter, 28-item GHQ is proposed consisting of 4 subscales; Somatic symptoms, Anxiety and insomnia, Social dysfunction and Severe depression. In next step, experimental group were subjected to 10- week aerobic exercises, 3 session per week and 60 minutes per session. Training protocol consisted of 60 minutes of warm up and stretching exercises (20 minutes), continuous running / jogging started from 20 mints for first week with %60 of maximum heart rate and ended to 30 mints for last week with %70 of maximum heart rate and cool down (10 mints). Subjects used polar heart rate evaluator to monitor their maximum heart rate. After completion of training protocol, all female subjects were asked to participate in post- test by the general mental health questionnaire and then data were collected and analyzed. The GHQ- 28 questionnaire consist of 28 questions in which the first 7 questions (items 1-7),

second 7 questions (items 8-14), third 7 questions (items 15-21), and forth7 questions (items 22-28) assess subscales of somatic symptoms, anxiety/ insomnia, social dysfunction and severe depression respectively. On the base of this method, each of test questions was scored according to Likert scoring (0, 1, 2 and 3). The GHQ-28 has been used in more than 70 countries including Iran and its validity has been approved by experts and psychologists. Therefore, due to the fact that GHQ-28 questionnaire has been used in Iran by several researchers it seems that reliability and validity of this questionnaire is at the high level. Descriptive and t-test at a significant level of $p < 0.05$ were used to analyze the findings data.

Results

In this present study, descriptive findings showed that 70 percent of female staffs aged 31-40 years, 93 percent were married, 38 percent worked in university 11to 15 years, 48 percent had Bachelor degree and 93 percent were official employed. Results indicated that there were significant differences in general mental health ($p < 0.01$), somatic symptoms ($p < 0.01$), and depression ($p < 0.01$) between experimental and control groups. But there were no significant differences in social dysfunction between pre and post- test of experimental group ($p < 0.55$) (Table 1).

Table 1. Comparison between pre-test and post-test of different variables in experimental group by dependent t-test.

Variables	N	Mean differences	SD	df	Observed-t	P
Somatic symptoms	30	3.5	2.37	29	8.07	0.01
Anxiety	30	2.27	2.26	29	5.5	0.01
Social dysfunction	30	0.4	3.9	29	0.61	0.55
Depression	30	1.2	2.03	29	3.3	0.01
Total general	30	7.33	7.3	29	5.5	0.01

Results also showed that there were significant differences in total general mental health ($p < 0.05$), somatic symptoms ($p < 0.01$), anxiety ($p < 0.01$), and depression between experimental and control groups but there were no significant differences in social dysfunction ($p > 0.83$). Table -2 showed the analyzed findings of experimental and control groups in

different variables by independent t-test (Table 2).

Discussion and Conclusion

During last few decades, exercise as an important therapeutic strategy has been studied to maintain and enhance the mental health of people (Ellis *et al.*, 2007; Hatami *et al.*, 2013; Martinsen *et al.*, 1989).

Our result of this study indicated that 10- week aerobic exercises had a positive significant effect on general mental health of female staffs working in university. The results of current study is in consistent with Hatami *et al.*, 2013; Liu *et al.*, 2010; Zarshenas, 2013; Careless *et al.*, 2008; Cohen, 2009; Ellis, 2007; Richardson, 2005; Kornreich, 2005; Abuomar, 2004) who showed that aerobic exercises

enhance general mental health of people. Several mechanisms can explain the mood and mental health improvement in our subjects. Aerobic exercises, in particular, improve blood flow and oxygen delivery to the brain. It has the added benefit of releasing endorphins (natural feel-good chemicals) into the body (Sharma *et al.* 2006).

Table 2. Comparison between pre-test and post-test of different variables in experimental group by independent t-test.

Variables	N	Mean differences	SD	df	Observed-t	P
Somatic symptoms	60	-2.77	1	58	-5.4	0.01
Anxiety	60	-1.7	0.8	58	-3.3	0.01
Social dysfunction	60	0.17	2.7	58	0.22	0.83
Depression	60	0.83	0.43	58	2.1	0.05
Total general	60	-5	4	58	-3.4	0.01

On the other hand, exercise produces changes in the concentration of several biological active molecules such as adrenocorticotrophic hormone, cortisol, catecholamine, opioid peptides and cytokines (Callaghan, 2004; Dimeo, 2001; Zarshenas *et al.*, 2013) which has been reported to affect mood and mental health. Moreover, some evidence suggests that exercise and physical activity can modify the concentration of neuroactive substance in the central nervous system (Callaghan, 2004). Result of the present study showed that 10-week aerobic exercises significantly improved somatic symptoms of female samples which have been supported by Atlantis(2004);Thorsen(2005). This effect is due to the fact that different forms of physical activities especially aerobic exercises improve physical symptoms such as cardio-respiratory system and bio-motor abilities(strength, endurance, flexibility, speed, and neuro-muscular coordination). Our findings also indicated that aerobic exercises including our training protocol in this investigation have been proved to reduced anxiety and depression significantly. These improvement in mood are proposed to be caused by exercise- induced increase in blood circulation to the brain and by an influence on the hypothalamic-Adrenal axis, and thus on the physiological reactivity

to stress (Sharma *et al.*, 2006). As explained before, physical activity can improve mental health by reducing anxiety and depression and negative mood. The ability of aerobic exercises to reduce symptoms of depression and anxiety in this study is in consistent with many published researches' findings (Paluska *et al.*, 2000; Guskowska, 2004; Liu, 2010; Strambeck, 2007; Thogerso, 2000). Finally, our finding showed that physical activity had not significantly improved social dysfunction. This result is supported by (Kornreich *et al.*, 2005; Peluse *et al.*, 2005), who stated that physical activity had no effect on social dysfunction. The reason for this finding may be due to the fact that in order to improve social dysfunction non-athlete females need to be involved in physical activity for long duration more than 10 weeks. Although, the mechanism that causes aerobic exercise to improve general mental health of people by reducing anxiety and depression symptoms and enhancing somatic symptoms is not clearly understood, but many researchers' findings claim that aerobic exercise is a valuable instrument to improve general mental health and its sub-scales. According to the results of the present study, it could be stated that physical activity in general and aerobic exercises in particular can cause improving in physical and

mental health and appropriate physical activity can positively affect on mental health. Aerobic exercise is also one of the ways in which can control anxiety and depression symptoms. However, it could be suggested that aerobic exercises and other forms of physical activities are an appropriate, easy and affordable approach for improving general mental health in non-athlete females.

References

- Abuomar K, Rütten A, Lehtinen V.** 2004. Mental health and physical activity in European Union, Institute for sport wissenschaft and sport. *Sozpraventiv medicine* **49(5)**, 301-309.
- Atlantis E, Chow CM, Kirby A, Fiatarone Singh MA.** 2004. An effective exercise-based intervention for improving mental health and quality of life measures: A randomized controlled trail. *Preventive Medicine Science* **(39)**, 424-434.
<http://dx.doi.org/10.1016/j.ypmed.2004.02.007>
- Callaghan P.** 2004. A neglected intervention in mental health care? *Journal of Psychiatric and mental health nursing* **11(4)**, 476-483.
<http://dx.doi.org/10.1111/j.1365-2850.2004.00751.x>
- Carless D, Douglas K.** 2008. Narrative, identity and mental health: how men with serious mental illness re-story their through sport and exercise? *Psychology of Sport and Exercise Science* **(9)**, 576-594.
<http://dx.doi.org/10.1016/j.psychsport.2007.08.002>
- Cash TF, Strachan MD.** 2004. *Body image: A handbook of theory, research, and clinical practice.* New York, NY, USA: Gilford Press. Cognitive behavioral approaches to changing body image, 478-486.
- Cohen GE, Shamus EPT.** 2009. Depressed, low self esteem: What can exercise do for you? *The International Journal of Allied Health Sciences and Practice* **7(2)**, 1-5.
- Coulson JC, McKenna J, Field M.** 2008. Exercising at work self-reported work performance. *International Journal of Workplace Health management* **1(3)**, 176-197.
- Dimeo F, Bauer M, Varahram I, Protest G, Halter U.** 2001. Benefits from aerobic exercise in patients with major depression: a pilot study. *British Journal of Sports medicine* **(35)**, 114-117.
<http://dx.doi.org/10.1136/bjsm.35.2.114>
- Ellis N, Crone D, Davey R, Grogan S.** 2007. Exercise interventions as an adjunct therapy for psychosis: a critical review. *British Journal of Clinical Psychology* **(46)**, 95-111.
<http://dx.doi.org/10.1348/014466506X122995>
- Guszkowska M.** 2004. Effects of exercise on anxiety. *Psychiatrie Pol* **38(4)**, 611-620.
- Hashemi Nazari SS, Khosravi J, Faghihzadeh S, Etemadzadeh S H.** 2007. Investigation of mental health in Fire Department' employees. *The Scientific Journal of Hakim* **10(2)**, 45-56.
- Hatami KH, Shokrollahi B, Haidari N.** 2013. The effect of aerobic activities on depression and anxiety symptoms and sleep disturbances of female students. *Middle-East Journal of Scientific Research* **14(2)**, 284-287.
- Kornrieck C, Nutte N.** 2005. The impact of regular physical activity on physical and mental health: how motivate the patient? *Service de Psychiatrie, Revue Medicale de Bruxelles* **26(2)**, 89-96.
- Liu X, Miller YD, Burton NW, Brown WJ.** 2010. A preliminary study of the effects of Tai Chi and Qigono medical exercise on indicators of metabolic syndrome, glycemic control, health-related quality of life, and psychological health in adults with elevated blood glucose. *University of Queensland, British Journal of Sports Medicine* **(44)**, 704-709.
<http://dx.doi.org/10.1136/bjsm.2008.051144>

Martinsen EW, Strand J, Paulsson G, Kaggstad J. 1989. Physical fitness level in patients with anxiety and depressive disorders. *International Journal of Sports Medicine* **(10)**, 58-61.

<http://dx.doi.org/10.1055/s-2007-1024876>

Paluska SA, Schwenk TL. 2000. Physical activity and mental health: current concepts. *Sports Medicine* **29(3)**, 167-180.

<http://dx.doi.org/10.2165/00007256-200029030-00003>

Peluse MA, Andrade LH. 2005. Physical activity and mental health: The association between exercise and mood. *Clinics* **60(1)**, 61-70.

<http://dx.doi.org/10.1590/S180759322005000100012>

Pezeshkan Website. 2009. [www. Pezeshkan.org](http://www.Pezeshkan.org).

Richardson CR, Faulkner G, Mc Devitt J, Skrinar GS, Hutchinson DS, Piette JD. 2005. Integrating physical activity into mental health services for person with serious mental illness. *University of Michigan, Psychiatric Services* **56(3)**, 324-331.

<http://dx.doi.org/10.1176/appi.ps.56.3.354>

Sharma A, Madaan V, Petty FD. 2006. Exercise for mental health. *Prim Care Companion Journal Clinical Psychiatry* **8(2)**, 106.

<http://dx.doi.org/10.4088/PCC.vo8no2o8a>

Thogerson Ntoumani C, Loughren EA, Duda JL, Fox KR, Kinnaefick FE. 2010. A feasibility study of a lunchtime walking intervention designed to increase walking, improve mental well-being and work performance in sedentary employees. *Rational and study design, BMC Public Health* **(10)**, 578.

<http://dx.doi.org/10.1186/1471-2458-10-578>

Thorsen L, Skovlund E, Strømme SB, Hornslien K, Dahl AA, Fossa SD. 2005. Effectiveness of physical activity on cardio-respiratory fitness and health related quality of life in young and middle-aged cancer patients shortly after chemotherapy. *Department of Psychosocial Oncology and Rehabilitation. Journal of Clinical Oncology* **23(10)**, 2378-2388.

<http://dx.doi.org/10.1200/JCO.2005.04.106>

Zarshenas S, Houshvar P, Tahmasebi A. 2013. The effect of short-term aerobic exercise on depression and body image in Iranian Women. *Depression Research Treatment. PubMed ID* 24349769.