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Annals of Biological Research, 2012, 3 (3):1220-1224

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Effect of acute whole body vibration training on cardiovascular risk factors in academic students

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ABSTRACT

The purpose of the present research was to determine the effect of acute whole body vibration training on cardiovascular risk factors in academic students. Thus, 35 students were randomly chosen from the students of Tehran Tarbiat Moalem university and were studied in 2 groups (WBVT, n = 20 & control, n = 15). The factors that were presumed to be the chief cardiovascular risk factors were measured. For data analysis, descriptive statistics and repeated ANOVA were applied at the 0.05 significance level and in SPSS 16 software. The results showed that there is no significant difference between cardiovascular risk factors of WBVT and control group subjects in pre- test. But, use of repeated ANOVA in posttest period showed significant difference between subject of control and WBVT groups. Using of post hoc tokay test indicated decrease in Total Cholesterol, Low-density Lipoprotein and Triglyceride, no difference in Systolic and Diastolic Blood Pressure and increase in High-Density Lipoprotein. Considering research findings, we can say that WBVT had positive effect on cardiovascular risk factors and lead to reduce in prevalence of cardiovascular diseases. Hence, a fundamental step to prevent of fatality due to cardiovascular diseases and to enhance the health-related quality of life can be WBVT performing.

Keywords: Cardiovascular risk factors, WBVT, Academic student.

INTRODUCTION

Recent findings emphasize that WBVT may provide a new way of training for peoples who are less willing to participate in exercise classes in gyms, or the ones who have difficulty in walking (Roelants, Delecluse, &Verschueren, 2004). Since the WBVT done while standing on the

Vibration platform, it reduces the probability of risk for injuries such as falling and stress fracture associated with other exercises; it is also possible to introduce WBVT as a suitable method for elder people. Studies on vibration have reported improvement in neuromuscular system too (Dolny& Reyes, 2008; Luo, McNamara, & Moran, 2005). A study conducted by Van Nes& colleagues (2004) supports the idea that WBVT has the potential to be used as a therapeutic tool for reducing the risk for falling and improving postural control in elderly (van Nes, Geurts, Hendricks, &Duysens, 2004). The probable hypothesis is if WBVT is able to stimulate the muscles effectively, it must have the ability to improve neuromuscular performance, balance and walking ability in elder subjects.

Cardiovascular diseases (CVD) are among the main reasons for fatality throughout the world as 17 million people lose their lives because of these diseases each year [4]. International research has reported that availability of delectable, high-energy foods and drinks as well as the increase in their variety has increased the energy intake and has led to a positive energy balance and consequently to the prevalence of obesity and overweight. Obesity and overweight can be measured using BMI and WHR [5]. Thus, if BMI is above 25, the person is overweight and if it is below 30, the person is obese [6]. Many mechanisms contribute to cardiovascular diseases and each of these mechanisms has specific risk factors; if any of these risk factors exceed the normal range, the possibility of cardiovascular diseases increases. Some of these risk factors include total cholesterol, triglyceride, fibrinogen, HDL, LDL, Apo A/Apo B ratio, systolic and diastolic blood pressures, and waist-hipratio. studied the relationship between obesity and cardiovascular risk factors in 20-70 years individuals in Tehran and came to the conclusion that the prevalence of obesity is 15% in men and 30% in women. Overall, the prevalence of obesity and overweight in the studied population was 63% and an increasing trend of this disease was observed in comparison with previous statistics. Moreover, the prevalence of high blood pressure was 20% in men and 23% in women and the level of prevalence increased with age in both groups. In this research, 50% of men had hypercholesterolemia and hypertriglyceridemia, but the prevalence of these disorders in women was 55 and 42 percent respectively. 49% of men and 51% of women had high LDL and 63% of men and 36% of women had low HDL. They concluded that in Iran like other countries - obesity is followed by the increase of cardiovascular risk factors [2].Jeremy But on and colleagues studied the level of cardiac risk factors and its relationship with overweight and fat distribution in children and came to the conclusion that high level of triglyceride and insulin and low level of high-density lipoprotein is associated with obesity. When this relationship was examined in overweight children, they concluded that these children also had high level of triglyceride and low levels of lipoprotein in comparison with normal children [7]. Véronique et al. (2005) studied effects of endurance training on blood pressure, blood pressure-regulating mechanisms, and cardiovascular risk factors and reported significantly decrease in body fat, total cholesterol, and triglyceride in subjects [8]. Arnt E et al. (2009) studied the Aerobic interval training reduces cardiovascular risk factors more than a multitreatment approach in overweight adolescents 3 hours of physical activity each week lead to lower blood pressure and reduces in harmful blood lipids [9]. Lars Bo et al. [2006] in the one study entitled Physical activity and clustered cardiovascular risk in children: a cross-sectional study (The European Youth Heart Study), showed the follow results: Odds ratios for having clustered risk for ascending quintiles of physical activity (counts per min; cpm) were 3.29 (95% CI 1.96-5.52), 3.13 (1.87–5.25), 2.51 (1.47–4.26), and 2.03 (1.18–3.50), respectively, compared with the most active quintile. The first to the third quintile of physical activity had a raised risk in all

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analyses. The mean time spent above 2000 cpm in the fourth quintile was 116 min per day in 9year-old and 88 min per day in 15-year-old children [10]. According to the research studies carried out in this regard, there is a strong relationship between physical activity and cardiovascular risk factors, but this relationship isnot clear about in WBVT. Further, WBVT is a new training program that is safe and non-expensive. Thus, the purpose of the present research is survey the effect of acute whole body vibration training on cardiovascular risk factors in academic students.

MATERIALS AND METHODS

The present research is descriptive-correlation. To carry out the research, 35 students were randomly chosen from the students of Tehran Tarbiat Moalem university and were studied in 2 groups (WBVT, n=20 & control, n=15). The factors Total Cholesterol, Low-density Lipoprotein, Triglyceride and Fibrinogen, Systolic and Diastolic Blood Pressure and High-Density Lipoproteinthat were presumed to be the chief cardiovascular risk factors were measured.

Cardiovascular risk factors such as LDL, HDL, TG, total cholesterol, and fibrinogen in pre- test and post- test were measured by a phlebotomist in the laboratory of the University of Medical Sciences, where 10 cc of blood was taken from the anterior cubital vein of subjects' left hand. Blood sampling was done at 8 to 9 A.M., so that the subjects would have gone 12 hours without food. The temperature of the blood sampling room was 23 degrees centigrade in both pretest and posttest levels. The blood samples were divided into serum and plasma. Serum was also divided into two parts; one part was used for measuring HDL and the other for measuring LDL. Kits made by Kyoma Co. were used for measuring HDL and LDL which was done using Beckman Spectrophotometer. Fibrinogen was measured based on one-step coagulation using Sigma Diagnostics kits. The spectrophotometer method was used for measuring TG and total cholesterol. To measure blood pressure, first the subject sat on a seat for 20 minutes until their heart rate reached the resting heart rate. Then using a Japan-made piezometer, systolic and diastolic pressures were measured (immHg).

WBVT group performed exercises for 12 days, 1 sessions per day and each session about 60 minutes using Whole Body Vibration Plate system, The Nemes-LB Bosco System (Table 1).

Training weeks	1	2	3	4	5	6	7	8	9	10	11	12
WBVT sets 2 min exercise 2 min rest	6×15 Hz	3×15 Hz 4×20 Hz	6×20 Hz	3×20 Hz 2×25 Hz	6×25 Hz	3×25 Hz 2×30 Hz	6×30 Hz	3×30 Hz 3×35 Hz	6×25 Hz	3×25 Hz 4×30 Hz	6×30 Hz	4×25 Hz

Table 1: Whole body vibration training program intervention

For data analysis, descriptive statistics and repeated ANOVA were applied at the 0.05 significance level and in SPSS 16 software.

RESULTS

The personal characteristics of subjects of two groups including age, height, weight, and BMI are presented in table 2.

Indices	Control	WBVT		
Age	21.57±2.50	23.57±1.08		
Weight	84.08±5.30	83.18±4.30		
Height	174.62±4.09	175.42±3.32		
BMI	23.46±1.23	22.36±1.03		

Fable 2: Persona	l characteristics	of subjects
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The results showed that there is no significant difference between cardiovascular risk factors of WBVT and control group subjects in pre- test. But, use of repeated ANOVA in posttest period showed significant difference between subject of control and WBVT groups. Using of post hoc tokay test indicated decrease in Total Cholesterol, Low-density Lipoprotein and Triglyceride, no difference in Systolic and Diastolic Blood Pressure and increase in High-Density Lipoprotein table 3.

 Table 3: Index of blood factors in pre and posttest for two groups

Time	Blood Factor Group	Total Cholesterol mg/dl	LDL mg/dl	HDL mg/dl	Triglyceride mg/dl	SBP mmHg	DBP mmHg	Р	F
Pre	WBVT	179.82 ±20.9	102.8 ± 18.4	45.4 ± 6.9	140.4 ±46.7	128.9 ± 7.4	81.6 ±8.8	0.122	12.98
	Control	173.82 ±19.8	106.1 ± 16.3	43.6 ± 7.8	138.9 ±36.6	130.2 ±4.6	80.3 ±7.7	0.123	
Post	WBVT	159.02 ±13.9	87.9 ± 14.2	54.3 ± 5.4	121.94 ±26.3	127.6 ±5.5	79.4 ±6.9	0.000	80.06
	Control	178.81 ±20.6	101.3 ± 18.8	45.7 ± 6.4	141.6 ± 38.4	126.7 ±4.6	78.7 ± 5.4	0.000	69.00

DISCUSSION AND CONCLUSION

The aim of this study was to determine the effect of acute whole body vibration training on cardiovascular risk factors in academic students. The results showed that there is no significant difference between cardiovascular risk factors of WBVT and control group subjects in pre- test. But, use of repeated ANOVA in posttest period showed significant difference between subject of control and WBVT groups. Using of post hoc tokay test indicated decrease inTotal Cholesterol, Low-density Lipoprotein and Triglyceride, no difference in Systolic and Diastolic Blood Pressure and increase in High-Density Lipoprotein.

Risk factors are generally divided into controllable and uncontrollable. Factors such as age, gender, family history, etc. are uncontrollable factors and inactivity, smoking, stress, obesity, etc. are controllable ones [11]. Although obesity is not the only cardiac risk factor, it is a critical factor in cardiovascular diseases, in particular heart infarction [11].

About of Probable reason for results of this research can be assumed that WBVT effect on subjects BMI hence that can be reduced cardiovascular risk factors. And the previous studies demonstrated that exercise training can be reducing the LPL, total cholesterol, triglyceride, and increase the HDL [12]. And other study demonstrated reduce in blood systolic and diastolic pressure for subjects with high blood pressure, but, for normal subjects no difference or a little increase in blood pressure after the endurance and strength training program. The results of this study consist the findings of previous study about this factor [13]. However, innovation of this study was for applied the vibration training as a safe method in short term. WBVT can be effect of cardiovascular risk factor and reduce the fatality result of this reason. Moreover, the WBVT can be performing in the inside of home and it performs no expensive. Furthermore, obesity, inactive, sedentary and elderly populations enable for it performs.

Considering research findings, we can say that WBVT had positive effect on cardiovascular risk factors and lead to reduce in prevalence of cardiovascular diseases. Hence, a fundamental step to prevent of fatality due to cardiovascular diseases and to enhance the health-related quality of life can be WBVT performing.

REFERENCES

[1]Luo, J., B. McNamara, and K. Moran. Sports Medicine, 2005.35(1): p. 23-41.

[2]Dolny, D. and G. Reyes. Current Sports Medicine Reports, 2008.7(3): p. 152-157.

[3] Van Nes, I., et al. *American Journal of Physical Medicine & Rehabilitation*, **2004**. 83(11): p. 867-873.

[4]Paul W. Franks, Robert. L, Bennett. M. N Engl J Med, 2010.362 (6): p. 485-493.

[6]Smith. S, Jackson. T, Pearson. V, Fuster. S, et al. Circulation, 2004.109(25): p. 3112-21.

[7]Gang. H, Pekka. J. Epidemiology and Prevention, 2010. 121: p. 237-244.

[8] Véronique A. Cornelissen, Robert H. Fagard. Hypertension, 2005. 46: p. 667-675.

[9]Arnt. E, et al. Clinical Science, 2009. 116: p. 317–326.

[10]Prof Lars Bo Andersen et al. *The Lancet*, **2006**. 368: p. 299 - 304.

[11]Fabiane. A, Canaan. R, Frandsen. P, et al. Arq. Bras. Cardiol, 2005.87(6): p. 666-671.

[12] Jeremie. B, Michel. B, et al. The Fleurbaix Laventie Metabolism, 2007. 56(5): p. 614–622.

[13]Ortlepp. J, Metrikat. J, Hoffmann. R. Journal of Obesity, 2003. 27:p. 979–982.