The Effects of Long-Term Exercises on Health-Related Blood Factors of Adult Men

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ABSTRACT: The results of research have shown the positive effects of physical activities in physical and mental health. However, the type, duration, frequency, intensity and other influential variables need further studies because in some cases the results of studies are contradictory. The purpose of this study was the examiner of the effects of log-term and low intensity (55-70% maximum heart rate) physical activity on blood factors of men. Pre-test and post-test were conducted. The Quasi-experimental research method was used and the sample was voluntary faculty members and staff of university to achieve fitness and health (n=25, age M= 39.44 ±1.56 year, weight 81.6±3.85 Kg). Before beginning exercise protocol, all participants were introduced to physicians and medical examination laboratories whether or not their participation in such exercises. After 36 sessions the different between level of low density lipoprotein, Apo B and total cholesterol was not significant. But there were significant differences between physical activity and fasting blood sugar, fibrinogen ,high density lipoprotein ,triglyceride -Apo A and Apo B/Apo A . According to the results of this research, it can be claimed that doing low intensity training have positive effects on health –related blood factors.


INTRODUCTION

More than 50 years ago, Morris (1953) demonstrated that more physically active workers have less risk for coronary heart disease. Since half a century, the beneficial effects of an active lifestyle have been extensively investigated. Yearly about 1.9 million people die premature due to a lack of PA (physical activity) (WHO, 2002). According to a national survey in America, merely approximately 12% of adults (over18years) take part regularly in vigorous exercises (WHO, 2010). National health institution of America reported that the cost of heart diseases 183, cancer 157, diabetes 100 and arthritis 65 billion $ .In short, the aforementioned diseases have caused such expenses amounting to 505 billion $ (Williams and williness, 2005). PA is the broadest concept and it incorporates all PA during work, transport to work or school for the youngsters, household activities and gardening, and leisure-time PA. It includes of course also sport (form of activity that involves competition) and exercise (form of leisure-time PA performed repeatedly over a more or less extended period with a precise objective such as improvement of physical fitness. Health is defined by the WHO as “a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity”. Since 1975 the American College of Sports Medicine (ACSM) published guidelines for exercise prescription, these guidelines have been revised approximately every 5 years. In 1978, ACSM published a first position statement: it was recommended that for maintaining and developing fitness in healthy adult’s people should exercise at 60-90 % of maximal heart rate, 3-5 days per week for 15-60 minutes (ACSM, 2006).

Similar guidelines were adopted by the American Heart Association. In the 1980s and early 1990s the recognition of the effect of moderate physical activity on health led gradually to new guidelines. Epidemiological studies have played a prominent role in the establishment of this shift in guidelines from vigorous exercise training to moderate physical activity on most if not all days of the week. In 1993 ACSM and the USA-Centers for Disease Control (CDC) partnered in drafting a statement on physical activity, which was published in 1995 (Pate et al, 1995).
This statement reads as follows: “Every U.S. adult should accumulate 30 minutes or more of moderate intensity physical activity on most, preferably all, days of the week”. Only one year later the U.S. Surgeon General report on physical activity and health was published (CDC-US department of Health and Human Services, 1996). S. Blair served as a senior scientific editor for this report. Most recently, the Institute of Medicine (IOM, 2002) and EURODIET (2006) recommended 60 or even 80 minutes of moderate to vigorous PA, daily, to prevent excessive weight gain and obesity.

The IOM and EURODIET recommendations are based on a much narrower body of knowledge than the CDC-ACSM or Surgeon General recommendations (Bouchard, Blair & Haskell, 2007). For children and adolescents the same guidelines (30 minutes of moderate physical activity on most, preferably all, days of the week) were used or 60 minutes were recommended (Beunen 2006). In a very recent review of more than 850 articles the available evidence in children and adolescents resulted in the following recommendation (Strong, Malina et al 2005): “School-aged youth should participate daily in 60 minutes of moderate to vigorous physical activity that is developmentally appropriate, enjoyable, and involves a variety of activities”.

It goes beyond the topic of this overview to give a fairly complete review of the accumulating evidence about the beneficial effects of PA on health (mortality, morbidity, risk factors, physical and mental health, and/ or other health indicators).

There are many studies on the effects of physical activities on physical and mental health, but their results are different. For example, Lowrel examined walking effect on lipoprotein of fat women's blood serum. These women participated in 3 walking in 15 weeks, each session about 45 minutes. The results showed that the effect of exercise on LDL, triglyceride and total cholesterol were not significant, but HDL of the subjects increased (Lowrel et. al, 1998).

Hakim et al (1998) followed 707 men aged 61 to 81 years during 12 years. These men were classified into three groups of moderate PA: those who walked on average 0.0 to 0.9 miles/day; those who walked 1.0 to 2.0 miles/day and those who walked between 2.1 and 8.0 miles/day. Over the twelve years follow up the total mortality was about 20% in the group who walked most per day, about 27% in the middle group and about 43% in the group who walked only between 0.0 and 0.9 miles/day. Similarly, Manson et al (1999) followed 72,488 nurses between 40 and 65 years during 8 years. The outcome variables were fatal and non-fatal cardiovascular events. The RR of cardiovascular events for the frequent walkers was 40% lower than for the infrequent walkers.

According to a study conducted in Tehran (the capital of Iran), 85% of women and 80% of men do not take part any kind of classical physical activity, even normal walking out of their workplace or at home (Azizi et. al, 2000). According to the report of Iranian Ministry of Health, 38.5 percent of death in Iran is due to coronary diseases (Asadpoor et. al, 2006). The findings of studies in 18 provinces of Iran showed that 46% of the whole deaths and 27.2% short life expectancy arise from these diseases (Sharifi, 2006).

In this regard Portland in 2002 stated that “we need an immediate, secure, reliable and free treatment used to decrease hygiene dangers related to some physical movement mistakes for all, whether rich or poor, man or woman, old or young, and I recommend doing physical activity at least 30 minutes per day” (Sharifi, 2006).

Serag Esmat et.al studied forty five patients with Metabolic Syndrome and found that total cholesterol, LDL, FBS, weight and triglycerides levels were lower and HDL was higher after moderate intensity exercises compared with levels before them. They also found a positive correlation between PAI-1 and LDL, PAI and triglycerides after exercise, and negative correlation between HDL and PAI-1. They believed that moderate intensity exercises cause favorable changes in metabolic syndrome in lowering lipid profile and PAI-1 levels and may reduce risk of cardiovascular diseases (Serag et. al, 2010).
Mouloud Aghajani Delavar et.al (2008) showed that moderate intensity physical activity decreased the systolic blood pressure, cholesterol, and triglyceride, and increased HDL cholesterol (Mouloud et. al, 2008).

There are many factors involved in the emergence of these diseases most important of which are as follow: Atherosclerosis, stress, age, gender, race, genetic factors, type of personality (A, B), blood pressure, lipoproteins of plasma, inactivity, obesity, cholesterol and triglyceride.

Hedef et.al, determined the effect of 8 week trainings on a group aged above 30 years, each week 3 training sessions, with 50-70 MHR% on treadmill and ergo meter. They found that the level of TG, and LDL decreased after these trainings (Hedef et. al, 2005).

Peter .T. Katzmarzky et.al examined the effect of a 20 week aerobic program on ergo meter. The sample was 295 men and 355 women with age range of 17-65 years. The results showed the increase in Vo2Max and decrease in body fat percent, but the difference in blood lipoproteins were not significant (katzmarzky te. al, 2005).

Fortunately, according to some available documents in U.S.A in recent two decades, the deaths arising from heart diseases have relatively had a satisfactory decrease and the age of victims of these diseases is increasing because of doing physical activities, decrease in fat consumption, and controlling blood pressure. Nevertheless, the percent of death due to the cardiovascular diseases is still high in United States America (Mozaffari, 2007).

**METHODODOLOGY**

The method of this study was quasi - experimental. Statistical sample includes the faculty members and employees of Tehran University (n=25, age = 39.44 ±1.56, weight 81.6±3.85).They participated in a 4 month (36 sessions) program, 2 sessions per week. Each session was approximately 100 minutes. The first session was lesser than 100 minutes but gradually the volume of session were increased. The protocol of exercise was conducted with intensity between 55-70% MHR. All of the subjects participated voluntarily with the aim of their wellbeing and health. The questionnaire measuring their level of physical activity is based on WHO international questionnaire. They were divided in two groups - active and non-active. The non-active group was selected. First, the subjects were introduced to laboratory to gather data about their risk factors and then to physicians to prescribe whether they can take part in physical trainings or not. These procedures were conducted because in the 1996, U.S Surgeon General stated that: previously inactive men over age 40, women over age 50, and people at the high risk of CHD have to consult a physician before embarking on a program of vigorous physical activity to which they are unaccustomed. People with disease should be examined by a physician(ACSM 2006). The protocol of exercises is summarized below:

1- Jogging and slow running in the first three sessions 5 minutes that gradually increased to 7 and 9 minutes.
2- Stretching for 15 to 20 minutes, the first sessions were a mixture of isometric and the other sessions were mixed of isometric, ballistic, isotonic and PNF stretches.
3- The main activity of these sessions was conducted through funny games, ball games and other pleasure activities with 55-75 MHR%. The intensity of exercises was controlled by counting of pulse rate with polar set (chess band) and speaking test. In speaking test the manner of subject's speaking and breathing rate and kind approximately shows the intensity of training pressure
4- Cooling down about 7 to 10 minutes.

Post test was conducted in the same laboratory after 4 months.
Paired T-test was used to analyze pre and post data. The results of the research is summarized and illustrated in table1.
Table 1: Evaluation of suitability of model indicators

<table>
<thead>
<tr>
<th>Statistic Blood factors</th>
<th>Paired Samples Test</th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Upper</td>
<td>Lower</td>
<td>Std. Error Mean</td>
<td>df</td>
<td>Std. Deviation</td>
<td>Sig</td>
<td>Mean</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>0.013</td>
<td>24</td>
<td>2.681</td>
<td>27.696</td>
<td>4.384</td>
<td>5.648</td>
<td>28.238</td>
</tr>
<tr>
<td>Triglyceride 2</td>
<td>0.009</td>
<td>24</td>
<td>2.840</td>
<td>3.984</td>
<td>-2.544</td>
<td>1.582</td>
<td>7.908</td>
</tr>
<tr>
<td>Cholesterol 2</td>
<td>0.653</td>
<td>24</td>
<td>0.455</td>
<td>-0.048</td>
<td>-3.792</td>
<td>.907</td>
<td>4.536</td>
</tr>
<tr>
<td>HDL – LDL2</td>
<td>0.045</td>
<td>24</td>
<td>1.389</td>
<td>9.745</td>
<td>-1.905</td>
<td>2.822</td>
<td>14.112</td>
</tr>
<tr>
<td>LDL – LDL2</td>
<td>0.178</td>
<td>24</td>
<td>5.947</td>
<td>10.399</td>
<td>5.041</td>
<td>1.298</td>
<td>6.491</td>
</tr>
<tr>
<td>ApoB – ApoB2</td>
<td>0.000</td>
<td>24</td>
<td>-4.739</td>
<td>-1.941</td>
<td>-4.938</td>
<td>.725</td>
<td>3.629</td>
</tr>
<tr>
<td>ApoA – ApoA2</td>
<td>0.000</td>
<td>24</td>
<td>6.351</td>
<td>0.146</td>
<td>0.074</td>
<td>.017</td>
<td>0.086</td>
</tr>
<tr>
<td>ApoB.ApoA- ApoB/ApoA22</td>
<td>0.000</td>
<td>24</td>
<td>1.889</td>
<td>6.696</td>
<td>-0.296</td>
<td>1.694</td>
<td>8.471</td>
</tr>
<tr>
<td>Fibrinogen- Fibrinogen2</td>
<td>0.038</td>
<td>24</td>
<td>2.195</td>
<td>10.400</td>
<td>0.320</td>
<td>2.442</td>
<td>12.210</td>
</tr>
</tbody>
</table>

DISCUSSION

The results of conducted studies were different, because the type, frequency, intensity, duration, volume, number of sessions, gender, age, occasion of exercise, location and the other variables were different. The research findings show that relatively low intensity and long-term exercises make desirable changes in most blood health-related factors. However, contrary to the generally accepted axiomatic principle that states physical exercises reduce the LDL level and accordingly the Apo B level as the factors causing artherosclerosis which causes cardiovascular diseases, the findings of this study proved such results. Based on many probable reasons, this contradiction continually necessitates many studies in order to answer the basic questions in this field. Nevertheless, the effects of such trainings were significant on, FBS, triglyceride, HDL and weren’t significant on LDL, total cholesterol and Apo B.

CONCLUSION

According to findings of this study, it can be recommended that instead of drug therapy and sometimes surgery, low intensity and long-term exercises done through enjoyable and pleasure games appropriate to this age group and the nature of their job may desirable effects on cardiovascular risk factors. In addition to preventing side effects of inactivity, the method could be used to improve the physical fitness, to make a friendly and pleasant atmosphere, to make a healthy relationship between faculty members and other personnel, and finally to introduce more qualified and competent students.

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276