

## **The relationship between physical activity level and risk factors for coronary heart disease for young sons**

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### **ABSTRACT**

*This study was conducted with purpose of examination of the relationship between physical activity level and risk factors for coronary heart disease (CHD) for young sons. 30 male students with a mean age of  $21.4 \pm 1.14$  years, height  $176 \pm 6.23$  cm, weight  $79.66 \pm 5.39$  kg and BMI  $23.6 \pm 2.53$  kilo grams per square meter as cluster and random sampling were selected as subjects. Subjects completed questionnaires related to health, consent forms and questionnaires of physical activity level(Beack).Measurements in this study were: determination of body weight, height, body mass index (BMI), the estimation of percent of the body fat and determination of risk factors for CHD include: Cholesterol (TC), triglycerides (TG), low density lipoprotein (LDL), high density lipoprotein (HDL), systolic blood pressure (SBP) and diastolic blood pressure (DBP).For data analysis, appropriate descriptive and inferential statistical methods such as the KOLMOGOROV- Smirnov, T student and Pearson correlation at the significant level of 0.05 are used. The results showed that the level of physical activity has significant negative relationship with blood cholesterol level and LDL. While were not seen a significant relationship between the physical activity level with HDL and TG. On the other hand, the results of this study showed that there is significant negative relationship between the level of physical activity with body fat mass, body fat percentage and body mass index (BMI). The results of this study showed that between systolic and diastolic blood pressure, there is no significant relationship with the level of physical activity. Choosing active lifestyle in addition to maintaining of body mass index in the appropriate range and reduce body excess fat, it lead to control and prevention of the risk factors of Cardiac - Coronary disease and thus promotes physical health.*

**Key words:** cholesterol, level of physical activity, Cardiac - vascular risk factors

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### **INTRODUCTION**

Although technology progress has many positive outcomes, but also has negative effects, one of the most significant of them in new era is inactivity. The fact is that inactivity is not compatible with the structure of human biomechanics physiology and the lack of activity in fact constitutes a joy, health and happiness of human.

According to numerous scientific evidences, inactivity in new era has become such a problem that it has entered into the list of risk factors for coronary heart[1, 2, 3]. Scientific evidences show that a sedentary lifestyle increases the risk of CHD[4, 5], so people with low mobility, two times more than active individuals are at high risk of coronary heart disease[2].The question that now needs to respond as precise and scientific, is whether physical activity reduces the adverse effects of coronary heart disease among students who due to an employment situation have chosen to sedentary life unexpectedly. In answering this question, researches results show that physical activity, exercise and an active life style helps to maintain and health promotion, especially in the prevention of heart -

Coronary disease [6, 7, , 8]. The results of a study on 3331 men show that Waist-to-hip ratio and the amount of triglyceride (TC) in those with more than three days a week had activity were significantly lower and amount of high-density lipoprotein (HDL) in active groups was significantly more than the sedentary groups [9]. Raitakari et al (1996), in a study entitled "Effects of physical activity during Leisure in changes of high-density lipoprotein cholesterol in 714 adult persons found that the increased activity and exercise increases the concentration of high-density lipoprotein cholesterol, that is, for example, 1 hour of strong exercise during a week, increases 42 MMOL/LITER the concentration of high-density lipoprotein cholesterol [10]. The results of Skoumas et al (2003) showed that the amount of cholesterol, low density lipoprotein (LDL) and triglyceride (TG) in active persons was lower, but their high-density lipoprotein (HDL) was higher [11]. Samuel et al (2007) reported that participation in appropriate physical activity may prevent the development of coronary heart disease risk factors such as: hypertension, obesity and overweight [12]. Other researches results showed that inactivity increases the risk factors such as overweight, insulin resistance, decrease of the diabetes and glucose resistance, increase of the total cholesterol, low-density cholesterol and decrease of the high-density lipoproteins and increase of the blood pressure [13]. Robert and colleagues (2008) reported that physical activity with moderate intense such as brisk walking can reduce heart - Coronary disease and prevents type 2 diabetes and its metabolic syndrome [14]. Also, Robert et al, (2009) found that the American blacks have high levels of high-density lipoprotein cholesterol (HDL-C) and low level of cholesterol, triglycerides and low density lipoproteins cholesterol. They concluded that increased physical activity has positive effects on metabolic risk factors, body composition and insulin sensitivity [15]. In contrast, regular physical activity in children reduces body fat, visceral fat, LEPTIN and increase of insulin sensitivity and high-density lipoprotein [15, 16, 17].

Other researches results showed that doing 60 minutes of moderate to vigorous physical activity every day of the week is appropriate to reduce heart- Coronary diseases and mental health increasing [18].

Woolf et al (2008) reported that in sedentary people the concentration of serum insulin and triglyceride is lower than active people and they had lower level of high-density lipoprotein cholesterol and subcutaneous fat thickness than the inactive group [19]. With the examination of age groups in this study, it was found that few research has been done on young people that they have been investigated the relationship between physical activity and lipoprotein lipid levels [20]. Since understand the existent situation and determine the health profile of the students, especially the examination of effect of physical activity and its relationship with risk factors for heart disease – coronary are so important, and due to the importance of physical activity and its possible effects on body fat, blood pressure, TC-HDL-C, TG, LDL-C, and the relationship of these factors to heart-coronary disease, this research will evaluate the relationship between level of physical activity with risk factors for coronary- heart disease (CHD) in young Boys.

## MATERIALS AND METHODS

### Statistical population and Statistical sample

The Statistical population of this research is consisted of healthy non-athlete male students. 30 male students were male were selected by cluster and random sampling. Participants were informed time of the program and its implementation and necessary information about research that must be met by the participants. After receiving the necessary information, all participants before participating in the tests were medically examined. Also, the preparation questionnaire to participate in sports activities (PARQ)<sup>1</sup> completed by the participants and they completed the BEACK 3 questionnaire to assess the level of physical activity of the participants.

### Methods of data collection

The data collection was done as follows:

The measurement of the Waist-to-hip ratio to estimate WHR and also body weight of participants measured by an accurate scale model of Camry 9003 EB with precision 1.0 kg and height was measured with a Meter. Body mass index (BMI: weight (kg) divided by the square of height (m)) was calculated. Peripheral measurement of the thickness of subcutaneous fat, were performed according to standard anthropometric measurement methods. Skin-fold thickness using caliper 5 model 1127 was measured in three areas: the chest, abdomen and thigh. All measurements for two times were done and then the mean for two measurements was measured and for calculating was used.

$$\text{Fat\%} = 0.39287(\text{sum of skin-fold thickness}) - 0.00105(\text{sum of skin-fold thickness})^2 + 0.015772(\text{age in years}) - 0.015772$$

Depletion from all participants who were fasted for about 12 to 14 hours, performed by a laboratory technician in the same conditions in terms of area and time (at 8 Morning). Participants blood samples after centrifugation and separation of serum for determining TG and TC and lipoproteins and LDL and HDL were tested.

### 1. Physical Activity Readiness Questionnaire

### Statistical methods

Statistical analysis of data was done using the computer program SPSS and descriptive and inferential statistical techniques including: LOLMOGRAPH - Smirnov- t-student and PEARSON Solidarity at significant level 0.05.

## RESULTS

Range of changes, mean and standard deviation of Anthropometric parameters of participants in Table (1) and average of standard deviation of cardiac risk factors in Table (2) has been reported. Also, results in Table (3) show that physical activity level has had negative and significant relationship with LDL and blood cholesterol. While, between the physical activity level and HDL and TG, and HDL, TG was not observed significant relationship. On the other hand, the results of this study showed that between the level of physical activity and body fat mass, body fat percentage and body mass index (BMI) there is a significant and negative relationship. Also, our results showed that there was no significant relationship between blood pressure and physical activity.

**Table 1 - Individual characteristic of participants**

Variables	± Standard deviation Average
Age (year)	21.4 ± 1.14
Stature (Cm)	176 ± 6.23
Weight (Kg)	79.66 ± 5.39
BF Percent	77.66 ± 6.73
Waist (Cm)	21.02 ± 4.67
Abdomen (Cm)	87.23 ± 6.39
Hip (Cm)	88.3 ± 5.9
Body fat mass (Kg)	99.9 ± 4.9
Body mass index ( Kg . m	23.8 ± 2.53
Systolic blood pressure (mm hg)	78.8 ± 2.69
Diastolic blood pressure (mmHg)	117 ± 9.87
Subcutaneous fat thickness in chest region (mm)	15.8 ± 5.7
Subcutaneous fat thickness in Abdominal region (mmHg)	13.9 ± 5.6
Thickness of subcutaneous fat in thigh region (mmHg)	15.7 ± 5.2

**Table 2 -Profile of young blood (mg. dl)**

Cholesterol	TG	HDL	LDL	VLDL
196.5 ± 29.5	169 ± 3.7	37.4 ± 2.9	117 ± 3.1	34.06 ± 7.3

**Table 3- the relationship of Level of physical activity with variables**

Variables	N	Level of physical activity	
		Pearson Correlation	P value
The amount of fat	30	r = 0.503	Sig = 0.005
Systolic blood pressure	30	r = 0.090	Sig = 0.635
Diastolic blood pressure	30	r = 0.250	Sig = 0.183
Cholesterol	30	r = 0.415	Sig = 0.023
LDL	30	r = 0.406	Sig = 0.026
TG	30	r = 0.048	Sig = 0.801
HDL	30	r = 0.302	Sig = 0.105
TG/ HDL	30	r = - 0.178	Sig = 0.347
Body fat in men	30	r = -0.558	Sig = 0.001
BMI	30	r = 0.528	Sig = 0.003

## DISCUSSION

This present study investigated the relationship between level of physical activity and risk factors for coronary heart disease (CHD) in young boys. The results of this study showed that the level of physical activity has had significant and negative correlation with LDL and blood cholesterol level. The results of this study is consistent with the findings of Le Mura et al (2000), the Santa et al, (2003)) and is not consistent with the findings of Fahlman et al (2002), Park et al (2003), Banz et al (2003) Takeshima et al (2004) [24, 25, 26, 27], which some of the reasons for that are related to the age, sex, disease, and level of physical activity, exercise duration. In this study are used people who have cardiovascular - cardiovascular diseases, are fat and Elderly and LDL levels in their body is high.

Additionally, their exercise duration was long and some have continued to 1 year. While participants in this study were young, healthy and free of disease, they were assessed by questionnaire without exercise training and physical activity. Results of this study showed that was not observed significant between the level of physical activity with HDLT and blood HDL TG levels, the result of some researches show that there is significant correlation between physical activity and HDL that means increasing physical activity increases HDL level, if the activity intensity is high [4].

Kim et al (2001), in a study of two groups, one with % 50 VO<sub>2</sub>MAX intensity and the other with 85VO<sub>2</sub>MAX intensity exercised, did not see much difference in improving lipid levels, although exercise for 6 to 12 months led increase HDL significantly[28]. Strenfeldt et al (1999) reported that athletes who participate in endurance activities in, comparison with disabled people have lower levels of LDL. Endurance exercise can also increase HDL. Reduction in LDL levels was rarely observed [29]. Kaczmarzyk et al (2000) reported that there is a significant relationship between physical activity and lipoprotein lipid-protein ratio and TG / HDL [30]. As studies show that regular physical activity with increasing HDL protective effects against heart disease in various ways can be created [15, 16, 20]. Rosengren et al (1997) reported that physical activity can help reduce cholesterol[20]. Resaland et al (2011) reported that there is a inverse significant relationship between VO<sub>2</sub>MAX with Plasma cholesterol and triglycerides and there is a significant positive relationship between HDL and VO<sub>2</sub>MAX/kg[31]. Various studies show that physical activity reduces blood lipid level, so according to the findings of this study that showed that there is a positive correlation between the level of physical activity and cholesterol level, low density (LDL), Lipoprotein, it is suggested that the with increase in students' physical activity level, we can reduce the risk of heart - coronary disease and take a step forward in order to increase the health of students. On the other hand, the results of this study showed that there is significant negative relationship between the level of physical activity, body fat mass, body fat percentage and body mass index (BMI). Rosengren reported there is a significant inverse relationship between physical activity and (BMI), which is compatible with findings of the present study[21]. Reynage (1996), in a study reported that there is a significant relationship between WHR, BMI, serum lipid and level of physical activity in amateur athletes. He found that the level of physical activity with body weight, BMI, WHR, cholesterol and TG has reverse ratio. Hunter et al reported that there is a significant relationship between intra-abdominal fat with CHD risk factors, but there is not the significant relationship between % BF and WHR with risk factors. Also, was observed a significant inverse relationship between CHD risk factors, intra-abdominal fat and physical activity levels that this relationship about % BF, and WHR with high level physical activity is true[6]. Kaczmarzyk et al (1999) found that there is significant relationship between all risk factors for heart disease and % BF in examination of Obesity, fitness and prediction of cardiovascular disease risk factors[30]. The results of this study showed that the mean BMI in 53.3 % of the male participants was higher than 25 kg per square meter. According to the World Health Organization, this amount of BMI is classified in people range with overweight[36]. Li et al, (2011) observed no significant correlation between BMI and risk factors of heart - Coronary disease[37]. Rin et al (2000) evaluated the relationship weight changes for 5 years with risk factors of CHD for 231 women and 218 men, and concluded that the weight changes are associated with changes in risk factors for CHD significantly and generally increase weight associated with adverse changes of CHD risk factors, also this association was stronger in men than in women [38]. Based on findings of this study, we can say that the body fat mass, body fat percentage and body mass index are directly related to blood lipid, blood lipid levels and it seems that the index is valid for the detection of blood lipid levels. So, the increase in this index may increase the risk of heart Cardiac-Vascular disease. Due to the high fat mass and body fat percentage for participants in this study, more attention to this issue is necessary. Also, because of studies have shown that regular exercise can decrease body fat in different persons, it is recommended that ways be developed to increase physical activity levels in order to increase student health level for young boy. On the other hand, our results showed that there is no significant correlation between blood pressure and physical activity level. Drygas et al (2000) reported that diastolic blood pressure in the sedentary group is more than vibrant group[4]. Gert et al (2003) reported that low level of physical activity and BMI is directly related to blood pressure in boys, they found that in the boys who their BMI is higher than 25 kg per square meter and they have low levels of physical activity, the excess ratio of the high blood pressure is 3.23 mmHg greater and in boys with high BMI and moderate to high levels of physical activity, the excess ratio of the high blood pressure is 2.34 to 2.5 mmHg[42]. As mentioned above, the results of this study is inconsistent with performed studies. In measuring blood pressure of participants of this research, both in those who had high level of physical activity and who had no high physical activity level in individuals, phenomenon of High blood pressure was not observed. According to the performed researches, physical activity reduces blood pressure in people with high blood pressure[39, 41, 42]. Since the participants of this study were not patients with high blood pressure and generally had normal blood pressure, hence there is no relationship between physical activity and blood pressure in this study and this issue may be due to normal blood pressure of participants.

## CONCLUSION

Regular exercise is effective in improving community health. Because of this, the results of this study suggest that students should pay more attention to their weight and physical activity. Due to this point that increasing levels of physical activity can improve health and reduce the risk of heart - Coronary disease, It is recommended that through different ways such as workshops, holding lectures meetings about advantages of regular exercise or even increasing the general units of physical education at the university students can be achieved a method for improving health and reducing diseases for them. Also, given the limitations of the studies in this field in Iran and the importance of increasing level of physical activity in achieving and maintaining a community health, further studies in this field is essential.

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