Scholars Journal of Arts, Humanities and Social Sciences **ISSN 2347-5374(Online)**
Abbreviated Key Title: Sch. J. Arts Humanit. Soc. Sci. **ISSN 2347-9493(Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjahss.2018.v06i12.012

The Effect of Physical Activity Program on Some Vitamin and Mineral Levels in Obese Children

Zarife Pancar*
Research Assistant Gaziantep University, School of Physical Education and Sport, Gaziantep-Turkey

***Corresponding author**
Zarife Pancar

Article History
Received: 04.12.2018
Accepted: 13.12.2018
Published: 30.12.2018

Abstract: The aim of this study was to investigate the effect of exercise program applied to obese children on Body weight, BMI, Iron, Sodium, Phosphorus, Magnesium, Creatinine, Chlorine, Potassium, Calcium Ferritin and B12 levels. The study included 40 boys, between the ages of 13-15, divided into two groups: one an obese group consisting of 20 boys, and the other, an overweight group also consisting of 20 boys. The children who participated in the study were included in a three-day-a-week program for 8 weeks. Body mass index (BMI) was used to determine obesity in the formation of groups. The children who participated in the study were given sporting games and duration of walking program which were chosen according to the branches which lasted 60 minutes in 3 days, 3 days a week. In the plasma blood samples taken at the beginning and at the end of the study, Body weight, BMI, Iron, Sodium, Phosphorus, Magnesium, Creatinine, Chlorine, Potassium, Calcium Ferritin and B12 levels were determined. SPSS 22.0 statistics software (SPSS Inc., Chicago, Illinois, USA) was used in the statistical analysis of data obtained in the study. The Independent Samples T test was used to compare the two groups, and the Paired Samples T test was used to analyze the difference between the pre and post-tests of the groups. In the analysis of the measured values of the obese subjects between the pre-test and the post-test, the body weight, Creatinine and Potassium levels were found to be significant in favor of the last test ($p<0.05$); body weight, BMI, Magnesium and B12 levels of the overweight group were found to be significant in favor of the last test ($p<0.05$). As a result, it can be said that eight-week physical activities have changed some vitamin and mineral values.
Keywords: Physical activity, Vitamin, Mineral.

INTRODUCTION

The concept of obesity is simply defined as the excess of energy taken from the energy consumed. In addition to these, genetic structure is influenced by the effects of energy metabolism, eating habits and complex interaction of socio-cultural factors. Obesity is a complex condition with close association with many diseases such as hypertension, cardiovascular disease, diabetes, degenerative arthritis, and thrombophlebitis. It is considered as a disease that concerns all age and socio-economic groups with extremely serious social and psychological effects [1,2]. Obesity, which is a health problem with epidemic features all over the world, also affects the child age group [3]. It is well known that obesity is associated with many diseases in the short and long term and in the majority of adult obese patients the onset of this condition extends to childhood [4].

Physical inactivity is the most important reason for the development of obesity. In modern societies, less energy is spent and works are being carried out. Especially in childhood, more time in front of the television causes the body to accumulate this energy as fat. As the human organism remains stationary, its physical activity capacity is reduced and it loses its fitness. The muscles weaken and the functioning of the joints decreases, and the energy resources are not consumed sufficiently and the weight gain and obesity begin [5-7]. Physical activity is an important function of living systems. It affects many systems and may also affect biochemical parameters. It is also known that biochemical levels vary depending on the type, severity and duration of the exercise [8].

MATERIALS AND METHODS

Selection of Subjects

The study included 40 boys, between the ages of 13-15, divided into two groups: one an obese group consisting of 20 boys, and the other, an overweight group also consisting of 20 boys. In order to determine obesity and to form the groups, Body Mass Index (BMI), which is calculated by dividing the individual's body weight (kg) by the square of his height (m) (BMI=kg/m2), was used. The subjects participating in the study were informed about the physical activity program and the laboratory tests that would be performed. Informed consent forms and written

confirmation for participation in the study were obtained from the parents of the children that were included in the study.

Experimental Design

The children who participated in the study were included in a three-day-a-week program for 8 weeks. This consisted of 60 minutes of selected active sports and games and a walk that gradually increased in duration. In the plasma blood samples taken at the beginning and at the end of the study, Body weight, BMI, Iron, Sodium, Phosphorus, Magnesium, Creatinine, Chlorine, Potassium, Calcium Ferritin and B12 levels were obtained from fasting blood samples collected while resting in the morning, one day before and one day after the 8-week exercise program.

Procedure

Physical Activity Program

The children who participated in the study were included in a three-day-a-week program for 8 weeks. This consisted of 60 minutes of selected sports games and a walk that gradually increased in duration. The physical activity program was prepared by considering the age and condition of children to achieve a heart rate during vigorous activity of between120-140 [9].

	1.day	2.day	3.day
1.week	30 min. walk	45 min. walk	60 min. walk
2.week	30 min. walk	45 min. walk	60 min. walk
3.week	15 min. warming/ 15 dk basketball	15 min. warming/ 20 dk basketball	15 min. warming/ 25 dk basketball
4.week	15 min. warming/ 15 dk basketball	15 min. warming/ 20 dk basketball	15 min. warming/ 25 dk basketball
5.week	15 min. warming/ 30 dk football	15 min. warming/ 5 dk football	15 min. warming/ 60 dk football
6.week	15 min. warming/ 30 dk football	15 min. warming/ 5 dk football	15 min. warming/ 60 dk football
7.week	45 min. walk	60 min. walk	75 min. walk
8.week	45 min. walk	60 min. walk	75 min. walk

Blood Testing Procedure

Venous fasting blood samples from the right arm were obtained from the children that participated in the study between 9:00-10:30 am at the Central Laboratory of the pediatric hospital, one day before and one day after the four-week physical activity program. The collected blood samples were centrifuged for seven minutes at 4000 rpm in a Nüve-NF800 device to separate the serum. Iron, Sodium, Phosphorus, Magnesium, Creatinine, Chlorine, Potassium, Calcium, Ferritin and B12 levels were tested in serum.

Statistical Analysis

Statistical analysis of the data obtained in the study was performed using SPSS package program SPSS 22.0 statistics software (SPSS Inc., Chicago, Illinois, USA). The Independent Samples T test was used to compare the two groups and the Paired Samples T test was used to analyze the difference between the pre-tests and post-tests of the groups.

RESULTS

The statistical analysis of the pre-test and post-test values of the obese and overweight groups is provided in the tables.

When the pre-test and post-test values of the measured values of obese subjects were examined, it was found statistically significant ($p < 0.05$) in terms of body weight, creatinine and potassium values. No statistical significance was found in other values ($p > 0.05$).

Table-1: Analysis of the values measured in obese subjects (n=20) between pre and post-tests

		Mean	Std. Dev.	t	p
Weight,	Pre-test	79,47	9,636	8,216	0,001
	Post-test	76,55	8,993		
BMI	Pre-test	28,75	2,147	1,325	0,212
	Post-test	27,85	3,154		
Iron	Pre-test	80,00	37,26	0,788	0,447
	Post-test	72,66	23,81		
Sodium	Pre-test	139,6	1,370	-0,252	0,806
	Post-test	140,0	5,632		
Phosphorus	Pre-test	4,625	,4653	0,898	0,388
	Post-test	4,458	,2712		
Magnesium	Pre-test	2,050	,1507	1,098	0,296
	Post-test	1,983	,1800		
Creatinine	Pre-test	,6683	,0777	-2,425	0,034
	Post-test	,7342	,0880		
Chlorine	Pre-test	108,3	2,309	-1,387	0,193
	Post-test	112,0	8,235		
Potassium	Pre-test	4,641	,1825	3,794	0,003
	Post-test	4,233	,3704		
Calcium	Pre-test	9,783	,2405	-0,186	0,856
	Post-test	9,800	,2215		
Ferritin	Pre-test	27,20	9,809	1,707	0,116
	Post-test	22,55	6,046		
B12	Pre-test	364,4	105,1	0,519	0,614
	Post-test	345,5	74,19		

Table-2: Analysis of the values measured in overweight subjects (n=20) between pre and post-tests

		Mean	Std. Dev.	t	p
Weight,	Pre-test	69,90	4,851	9,771	0,001
	Post-test	66,81	4,618		
BMI	Pre-test	26,36	,2443	8,810	0,001
	Post-test	25,22	,4345		
Iron	Pre-test	76,80	17,60	-1,089	0,294
	Post-test	84,66	30,35		
Sodium	Pre-test	139,7	1,709	-1,521	0,151
	Post-test	142,3	6,019		
Phosphorus	Pre-test	4,573	,4008	0,886	0,390
	Post-test	4,446	,3925		
Magnesium	Pre-test	2,113	,1457	4,672	0,001
	Post-test	1,860	,2472		
Creatinine	Pre-test	,6513	,0502	-0,770	0,454
	Post-test	,6673	,0990		
Chlorine	Pre-test	109,0	1,927	-0,355	0,728
	Post-test	109,8	8,166		
Potassium	Pre-test	4,426	,3390	1,325	0,207
	Post-test	4,540	,4702		
Calcium	Pre-test	9,726	,3011	0,106	0,917
	Post-test	9,713	,3377		
Ferritin	Pre-test	28,07	10,84	1,662	0,119
	Post-test	23,86	10,64		
B12	Pre-test	416,3	120,2	2,157	0,049
	Post-test	356,8	76,23		

Table-3: Intergroup analysis of pre-post test differences of measured values in obese and overweight subjects

		Mean	Std. Dev.	t	p
Weight,	Obese	-3,091	1,053	0,004	0,997
	Overweight	-3,093	1,226		
BMI	Obese	-1,500	1,023	-1,199	0,242
	Overweight	-1,140	0,501		
Iron	Obese	-7,333	32,21	-1,312	0,201
	Overweight	7,866	27,96		
Sodium	Obese	,4167	5,728	-0,903	0,375
	Overweight	2,600	6,620		
Phosphorus	Obese	-,1667	,6429	-0,174	0,863
	Overweight	-,1267	,5535		
Magnesium	Obese	-,0667	,2103	2,294	0,030
	Overweight	-,2533	,2099		
Creatinine	Obese	,0658	,0940	1,484	0,150
	Overweight	,0160	,0805		
Chlorine	Obese	3,666	9,158	0,775	0,446
	Overweight	,8667	9,463		
Potassium	Obese	-,4083	,3728	-2,175	0,039
	Overweight	-,1133	,3313		
Calcium	Obese	,0167	,3099	0,186	0,854
	Overweight	-,0133	,4858		
Ferritin	Obese	-4,655	9,449	-0,119	0,906
	Overweight	-4,211	9,811		
B12	Obese	-18,91	126,2	0,810	0,385
	Overweight	-59,53	112,1		

CONCLUSION AND DISCUSSION

In this study; the aim of this study was to investigate the effects of 8-week physical activity on selected vitamins and mineral levels in obese and overweight males. Minerals are a group of essential nutrients that form the structure in our bodies and regulate many functions. Although they form a very small part of your body like 4%, they help to form the body structure. Bones, teeth, muscles, blood and other tissues are also found in minerals. Vitamins are organic compounds that are not synthesized in a proportion in the body, stimulating significant reactions in cell metabolism with very small amounts of life required for life. Vitamins are essential for the protection of human health [10,11].

Age, gender, genetic predisposition, nutrition, nutrition knowledge and habits, psychological factors, home-based and sedentary lifestyles provide the basis for the development of obesity in children. In adolescence, there is an increase in fat mass in both sexes and in males in muscle tissue during the process of physical growth [12]. Obesity is known to be a risk factor for cardiovascular diseases. Insulin resistance, diabetes, dyslipidemia and atherosclerotic diseases are more common in obese patients than non-obese patients [13,14]. According to a large number of studies, it is emphasized that there is a close relationship with cardiovascular risk factors such as hypertension, hyperlipoproteinemia, diabetes and smoking [15-17].

Physical, physiological, psychological and motoric features of individuals who exercise are said to be positively affected and developed [18]. Exercise creates stress in the human organism, this stress also creates a variety of physiological and metabolic effects in the human body. One of these effects is changes in the blood [19]. In our study, a significant difference was found in the creatine and potassium values of the obese group in favor of the last test. BMI of the overweight group and magnesium B12 levels were significant. In the intergroup analysis of obese and overweight groups, there was a change in magnesium and potassium values in favor of the overweight group. Exercise-related reduction in body weight occurred in both groups. It was also thought that creatinine potassium and magnesium were reduced due to exercise and were caused by heating and fluid loss.

The body mineral content consists of 2 % sodium, 5 % potassium and 3 % chlorine. Sodium, chlorine and potassium are present in whole body fluids and tissues. The most important functions of these elements in the body body balance, acid-base balance and muscle to ensure the regular operation. Sodium, chlorine and potassium are absorbed in the small intestine and excreted in urine, feces and sweat. In such cases it is necessary to remove the minerals thrown away. The average 20-28 grams of magnesium in the human body is found in 60% of the bones, 27% in the muscles, 13% in the other tissues and body fluids. Magnesium has duties in the body such as energy metabolism, regular functioning of the muscle and

nervous system, formation of bones and teeth, regulation of blood pressure [10].

As a result, 8-week physical activity in obese and overweight children may cause some changes in vitamin and mineral values. It can be said that especially the overweight group participated in the activities in proportion to the weight. It is important to replace the vitamins and minerals that are important for these bodies and systems and to ensure the fluid balance in their loss.

REFERENCES

1. Hofbauer KG, Nicholson JR, Boss O. The obesity epidemic: current and future pharmacological treatments. Annu. Rev. Pharmacol. Toxicol.. 2007 Feb 10;47:565-92.
2. Altunoğlu E. Ve ark. Obezite ve Tiroid Fonksiyonları, İstanbul Tıp Derg - Istanbul Med J. 2011;12(2): 69-71.
3. WHO. Obezity Preventing and Managing The Global Epidemic. Report of WHO Technical Report Series 894. Geneva: World Health Organization. 2000.
4. Mo-suwan L, Tongkumchum P, Puetpaiboon A. Determinants of overweight tracking from childhood to adolescence: a 5 y follow-up study of Hat Yai schoolchildren. Int J Obes Relat Metab Disord. 2000;24:1642-7.
5. Bray GA. Classification and evaluation of the obesities. Med Clin North Am. 1989;73:161-184.
6. Taras HL, Sallis JF, Patterson TL, Nader PR, Nelson JA. Television's influence on children's diet and physical activity. Journal of Developmental and Behavioral Pediatrics. 1989 Aug.
7. Buchowski MS, Sun M. Energy expenditure, television viewing and obesity. Int J Obes. 1996;20:236-244.
8. Akmakçı E ve Pulur A. Milli Takım Kamp Döneminin Bayan Taekwondocularda Bazı Biyokimyasal Parametreler Üzerine Etkileri, S.Ü. Bes Bilim Dergisi. 2008 Cilt 10, Sayı 1, 39-47
9. Baltacı G, Obezite ve Egzersiz. Klasmat Matbaacılık, 1. Basım. Ankara. 2008
10. Samur G, Vitaminler, Mineraller ve Sağlığımız, Klasmat Matbaacılık, yayın no:227: 2008.
11. Jackson MJ. Diagnosis and detection of deficiencies of micronutrients, minerals. British Medical Bulletin. 55(3):634-42, 1999.
12. Karaağaoğlu N. Çocukluk çağı şişmanlığı ve tedavisi. Beslenme ve Diyet Dergisi. 1996; 25(1):53-62.
13. Wycocki M, Krotkiewski M, Magnus B, Bagge U. Hemorheological disturbances, metabolic parameters and blood pressure in different types of obesity. Atherosclerosis. 1991; 88: 21-28.
14. Avellone G, Di Garbo V, Cordova R, Raneli G, De Simone R, Bompiani G. Coagulation, fibrinolysis and haemorheology in premenopausal obese women with different body fat distribution. Thrombosis research. 1994 Aug 1;75(3):223-31.
15. Bonithon-Kopp C, Levenson J, Scarabin PY, Guillanneuf MT, Kirzin JM, Malmejac A, Guize L. Longitudinal associations between plasma viscosity and cardiovascular risk factors in a middle-aged French population. Atherosclerosis. 1993 Dec 1;104(1-2):173-82.
16. Solerte SB, Fioravanti M, Pezza N, Locatelli M, Schifino N, Cerutti N, Severgnini S, Rondanelli M, Ferrari E. Hyperviscosity and microproteinuria in central obesity: relevance to cardiovascular risk. International journal of obesity. 1997 Jun;21(6):417.
17. Simone G, Devereux RB, Chien S, Alderman MH, Atlas SA, Laragh JH. Relation of blood viscosity to demographic and physiologic variables and cardiovascular risk factors in apparently normal adults. Circulation. 1990; 81: 107-117.
18. Fox EL, Bowers RW, Foss ML. Beden Eğitimi ve Sporun Fizyolojik Temelleri, Bağırgan Yayınevi, Ankara, 1999, ss .241, 288, 291, 355.
19. Hazar S, Yılmaz G, Submaksimal Koşu Bandı Egzersizinin Bağışıklık Sistemine Akut Etkisi 10th International Sports Science Congress. October, 2008, 23-25, Bolu.