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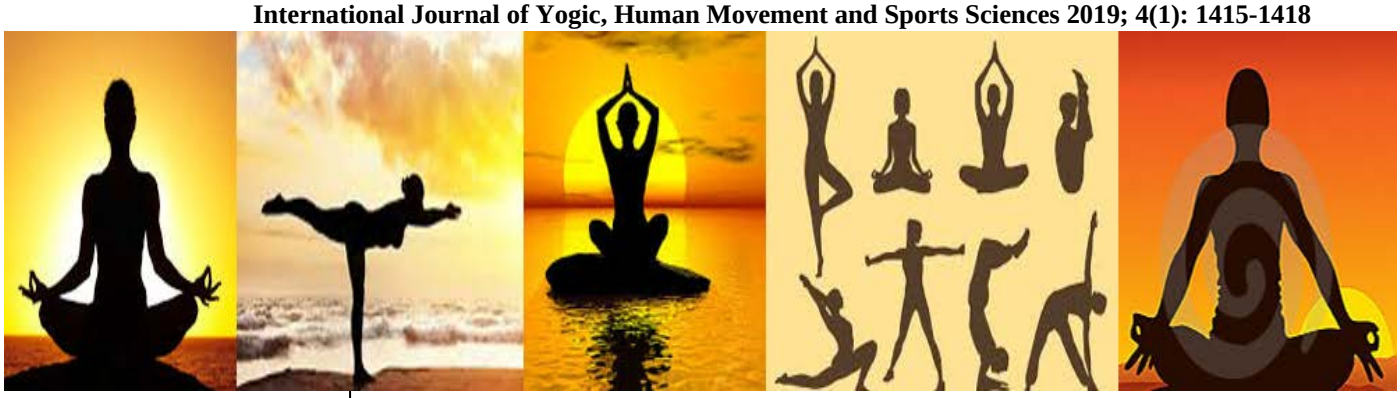

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Dr. Kishor Kumar BS
Associate Professor & Head
Department of Physical Education, SAS SNDP Yogam College, Konni, Kerala, India

Correspondence
Dr. Kishor Kumar BS
Associate Professor & Head
Department of Physical Education, SAS SNDP Yogam College, Konni, Kerala, India

Effect of power walking programme on physiological and bio-chemical variables among middle aged men

Dr. Kishor Kumar BS

Abstract
The purpose of the study was to investigate the effect of power walk training programme of three months duration on various physiological and bio- chemical variables among middle aged men. Thirty subjects were randomly selected from either experimental group or control group for this study. The selected variables are percentage body fat, body mass index, VO2, max, Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL), Low Density Lipoprotein Cholesterol (LDL), Very Low Density Lipoprotein Cholesterol VLDL) and Triglycerides (TG). From the study it was found that after three months of training, a significant reduction was noted in percentage body fat, body mass index, TC, LDL, VLDL and TG. This study highlights that, systematic Power walking helps to reduce the risk factors in our blood lipids.

Keywords: Power walking, body mass index, VO2, max, Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL), Low Density Lipoprotein Cholesterol (LDL), Very Low Density Lipoprotein Cholesterol VLDL) and Triglycerides (TG).

Introduction
Modern Industrialization and computerization have, alongside its large amount of benefits, brought certain disadvantages. One of the main disadvantages is physical inactivity. According to World Health Organization, "Physical inactivity contributes annually to two million deaths globally". The combination with sedentary lifestyle, improper diet and physical activity is estimated to cause up to eighty percent of premature Coronary Heart Diseases. Blood lipids have a major role in the coronary heart diseases. Blood cholesterol levels are directly related to Coronary Heart Diseases (CHD). Cholesterol is a white, powdery substance that is found in all animal cells and in mal-based foods. It is an essential nutrient necessary for many functions. When cholesterol levels rise in the blood, they can have dangerous consequences, depending on the types of cholesterol.

To prevent and reduce the risks in blood lipids medical experts and researchers have started recommending physical training as part of their treatment programme with the perception that regular physical activity may play a major role. Duscha B D, Slentz CA et al (2005) [4] in their study found that the effects of exercise in middle aged men and women are in positive manner. Current guidelines recommend at least thirty minutes of moderate physical activity per day. In the field of physical activities, Power walking is a very good and easy aerobic training. It will provide sufficient stimulus to improve cardio respiratory fitness for all age groups. The Harvard Alumni Study (2004) [5] found that men who walked just 1.3 miles a day had a twenty two percent lower death rate than those who walked less than 0.3 miles a day. Power walking is marked by speed, liveliness and vigor. It offers virtually the same health and fitness benefits as running and jogging. Power walking is walking at the ratio of about 4 mph with energetic arm motion.

The researcher found that, increased physical activity induces a number of positive changes in the metabolism of lipoproteins. So the present study underlines the benefits of health related physical fitness programme like walking, jogging, running, swimming, cycling etc., (aerobic exercise)

Methodology
Thirty middle aged (35-50) men working at various government departments in Thiruvan

-thapuram, were randomly selected as subjects from a population of sixty two persons who volunteered for the study. The selected subjects were randomly divided into two groups; experimental group (N:15) and control group (N:15).The experimental group underwent a Power walking training programme for twelve weeks, while the control group did not undergo any training.

The data were collected from the subjects on two occasions went four hours before the commencement of the training programme and thereafter, forty eight hours after the completion of the twelve weeks training programme. The method used for testing the bio-chemical variables were calorimeter using reagent kit, body fat measured by skin folds, body mass index, using the formula and Vo2 max also using the particular formula.

Analysis of the data and results of the study

The result of 'F' ratio in every data were tested for significance at 0.05 level of confidence from the given table values. The data collected on body weight prior to and after the completion of the experiment among experimental and control group are statistically analyzed and represented in table 1.

Table 1: Table showing analysis of covariance for body fat among experimental and control groups

		Exper. Gr(1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	23.55	21.65	Between	27.07	1	27.07	13.63
	SD	1.82	0.81	Within	55.99	28	1.98	
Post-test	Mean	20.68	23.19	Between	47.52	1	47.52	31.32
	SD	1.52	0.85	Within	42.48	28	1.51	
Adjusted post test Mean		24.78	20.42	Between	78.29	1	78.29	186.80
				Within	11.31	27	0.41	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table 1 shows that, the adjusted post test means of body fat control groups resulted in an F ratio of 186.80 which shows a significant difference as it is greater than the table value. This data indicates that Power walking induced decrease in the body fat for the experimental group after the commencement of training.

Table 2: Table showing analysis of covariance for VO2 max among experimental and control group.

		Exper. Gr(1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	3.36	3.44	Between	0.048	1	0.048	1.307
	SD	0.21	0.17	Within	0.03	28	0.036	
Post-test	Mean	4.17	3.52	Between	3.19	1	3.19	55.52
	SD	0.28	0.19	Within	1.60	28	0.0574	
Adjusted post-test Mean		3.19	3.60	Between	3.68	1	3.68	06.01
				Within	0.93	27	0.0347	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table ll shows that, the adjusted post test means of V02 max among experimental and control groups resulted in an 'F ratio of 106.01 which shows a significant difference as it is higher than the table value.

This indicates that Power walking induced increase in the VO2 max for the experimental group after the completion of training period.

Table III: Table showing analysis of covariance for total cholesterol among experimental and control groups

		Exper. Gr(1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	224.07	228.07	Between	172.80	1	172.80	0.87
	SD	16.63	16.83	Within	5514.66	28	196.95	
Post-test	Mean	221.13	245.07	Between	4296.03	1	4296.03	33.97
	SD	7.33	14.11	Within	3540.66	28	126.45	
Adjusted post-test Mean		222.12	244.07	Between	3503.07	1	3503.07	36.41
				Within	2597.19	27	96.19	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table III shows that, the adjusted post test means of total cholesterol among experimental and control groups resulted in an F ratio of 36.41 which shows a significant difference as it is greater than the table value.

This indicates that Power walking causes to reduce the total cholesterol for the experimental group after the training. The results were in confirmation with the findings of Couillard. C *et al.* (2001) [1]. Thompson. P D *et al*. (2004) [12] and Durstine J. L *et al.* (2002) [3].

Table IV: Table showing analysis of covariance for triglycerides among experimental and control group

		Exper. Gr(1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	108.00	107.33	Between	3.33	1	3.33	0.01
	SD	20.34	13.25	Within	8249.33	28	294.61	
Post-test	Mean	101.20	120.07	Between	2669.63	1	2669.63	9.13
	SD	20.01	13.56	Within	8183.33	28	292.26	
Adjusted post test Mean		101.02	120.24	Between	2770.69	1	2770.69	12.89
				Within	5809.01	27	215.14	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table IV shows that, the adjusted post test means of Triglycerides among experimental and control groups resulted in an F ratio of 12.87 which shows a significant difference as it is greater than the table value.

This data indicates that Power walking induced decrease in the Triglycerides for the experimental group after the commencement of training. The result of the study were in confirmation with the findings of Jeppensen. J. *et al*. (2001), Lemieux *et al*. (2001) [9] and Leroux. G. *et al*. (2000) [10].

Table V: Table showing analysis of covariance for HDL among experimental and control groups

		Exper. Gr(1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	36.85	33.27	Between	95.76	1	95.76	3.87
	SD	5.97	3.72	Within	692.22	28	24.72	
Post-test	Mean	47.22	32.66	Between	1589.95	1	1589.95	47.98
	SD	5.01	6.41	Within	927.76	28	33.13	
Adjusted post test Mean		46.29	33.59	Between	1062.88	1	1062.88	38.75
				Within	740.47	27	27.42	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table V shows that, the adjusted post test means of HDL cholesterol among experimental and control groups resulted in an 'F ratio of 38.75 which shows a significant difference as it is greater than the table value. This indicates that Power walking increased HDL cholesterol for the experimental group after the twelve weeks training period. This result agrees with those of the studies done by Durstine J.L *et al*. (2001) [2] and Katzmarzyk P.T et al (2001) [7].

Table VI: Table showing analysis of covariance for LDL among experimental and control groups

		Exper. Gr (1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	164.16	173.90	Between	711.50	1	711.50	1.96
	SD	22.55	14.63	Within	10115.95	28	361.28	
Post-test	Mean	151.82	183.19	Between	7379.01	1	7379.01	78.09
	SD	9.23	10.18	Within	2645.64	28	94.48	
Adjusted post test Mean		153.37	181.65	Between	5605.02	1	5605.02	92.76
				Within	1631.35	27	60.42	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table VI shows that, the adjusted post test means of LDL cholesterol among experimental and control groups resulted in an F ratio of 92.76 which shows a significant difference as it is higher than the table value. This indicates that Power walking induced decrease in the LDL cholesterol for the experimental group after the completion of training period. This result of the study was in confirmation with the findings of Lemieux et al (2001) [9].

Table-VII: Table showing analysis of covariance for VLDL among experimental and control group

		Exper. Gr(1)	Control Gr(2)	SOV	Sum Of Squares	df	Mean squares	F-ratio
Pre-test	Mean	23.01	23.03	Between	3.00	1	3.00	0.07
	SD	7.65	4.75	Within	1135.71	28	40.56	
Post-test	Mean	22.12	29.34	Between	390.24	1	3902.24	28.63
	SD	2.63	4.51	Within	381.60	28	13.63	
Adjusted post test Mean		22.13	29.33	Between	389.60	1	389.60	37.07
				Within	283.78	27	10.51	

The table value for significance at 0.05 level of confidence with degrees of freedom one and twenty seven and one and twenty eight are 4.21 and 4.20 respectively.

Table Vll shows that, the adjusted post test means of VLDL Cholesterol among experimental and control groups resulted in an 'F' ratio of 37.07 which shows a significant difference as it is greater than the table value.

This indicates that Power walking causes to reduce the VLDL Cholesterol for the experimental group after the completion of training period. The result of this study was in line with the results Nakaya N (1999) [11] and Klen Kalaustian *et al*. (2001) [8]

Conclusions

Based on the twelve weeks power walking training programme the following conclusions were drawn:

Participation in systematic power walking programme resulted in a significant reduction in body fat, total cholesterol, tryglycerides, low density lipoprotein cholesterol, and very low density lipoprotein cholesterol levels among the experimental group when compared with the control group

There was a significant increase in Vo2 max and high density lipoprotein cholesterol, for the experimental group as compared to control group.

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