INDIVIDUALISED COMBINED EFFECTS OF BRISK WALKING FARTLEK TRAINING ON HDL AND TOTAL CHOLESTEROL ON UNTRAINED COLLEGE MEN

Dr.M.RAMAJAYAM
B.A, M.P.Ed., PGDY. MSc(Y),PGDSM, DSO, MPhil, PhD.
Assistant Professor
Faculty of General and Adapted Physical Education & Yoga
Ramakrishna Mission Vivekananda Research Institute
Coimbatore-641020

ABSTRACT

Introduction:- The higher the HDL cholesterol level, the lower the risk of coronary artery disease. Walking increases cardio vascular and pulmonary fitness, muscle strength and endurance. It reduces the body fat and heavy risk of coronary heart diseases and stroke. It lowers blood pressure, reduces high cholesterol and improves the lipid profiles. Fartlek training system was practiced long time in Finland. Fartlek means pace play during cross country running. The experienced runner who has been using interval training to develop speed and raise the anaerobic threshold. Fartlek is also very effective for athletes of all games and sports.The purpose of the study was to find out Individualized combined effects of brisk walking fartlek training on HDL and total cholesterol on untrained college men. **Methodology:-** To achieve the purpose of the present study sixty men subjects were selected from Rama Krishna Mission College of arts and science, Coimbatore, Tamil Nadu. The subjects age 18 to 21 years. They were divided to four groups namely group-I Brisk walking training group, (BWTG) group-II fartlek training group (FRKTG), group –III combined training group (Brisk walking with fartlek training group (CMBDTG) and group-IV acted as control group(CG). Each group consists of fifteen men subjects. The practice of brisk walking training was given for 12 weeks 3 days (Monday, wednes day and Friday) 12 weeks and morning 7.00 am to 8.00. The practice of farlek training was given for 12 weeks 3 days (Monday, wednes day and Friday) 12 weeks and evening 5.00 pm to 6.00 pm. The practice of combined (brisk walking + fartlek training) were given for 12 weeks 3 days (Tuesday, Thursday and Saturday) 12 weeks and morning 7.00 am to 8.00. The control group did not participate any special activity apart from their regular activities. The training groups were High Density Lipo Proteins (HDL), Total Cholesterol assessed with (Enzymatic caloric method) lab test help of lab chemists. Pre and post test training data were collected and treated with 't' test and Analysis of co variance. If results of 'F' is significant to find out paired mean difference post hoc test of scheffe's was used. The significant level was confirmed at 0.05. **Results:-** The study is results expressed that the experimental groups had improved HDL and reduced total cholesterol due to twelve weeks of training. Among the three training groups better improvement on HDL and reduction of total cholesterol combined training group on compared with other training groups of untrained college men. The control group did not any changes on dependent variables of untrained college men.

Conclusion:- The training groups (Brisk, fartlek, and Combined training) had significantly the increased the HDL and significant reduction of total cholesterol of untrained college men. The combined training group better improvement of HDL and reduction of total cholesterol compared with other training groups. The control group did not change on selected HDL and total cholesterol.

Introduction

Training is defined as systematic process of repetitive, progressive exercise or work, involving the learning process and acclimation **(Ajmer Singh 2002).** Sports training are a performance and competition orientated process. It is planned and carried out for the purpose of participating successfully in competitions **(Hardayal Singh 1991**).

Walking may be considered the preferred exercise for primary education because it provides both endurance and balance. It is the primary performance on which many activities of daily living depend upon walking has been shown to haves significant benefits and minimal associated risks. As long as there are contra indications. The benefits of walking almost certainly out weight the risk in the majority of people with diabetes. Walking is very aerobic activity in nature as they stress endurance (**Heitkamp et al 2008).**

The body use fats and carbohydrates as its main fuels. The carbohydrate usage (both blood glucose and muscle glycogen) increased with walking intensity. Blood sugar responses will vary with the duration of walking as well as the intensity. Walking improve blood circulation and helps the blood delivery oxygen to the lungs and tissues more efficiency. Walking increases cardio vascular and pulmonary fitness, muscle strength and endurance. It reduces the body fat and heavy risk of coronary heart diseases and stroke. It lowers blood pressure, reduces high cholesterol and improves the lipid profiles **(Durstine et al.,2002).**

Fartlek training system was practiced long time in Finland. Fartlek means pace play during cross country running. The experienced runner who has been using interval training to

develop speed and raise the anaerobic threshold. Fartlek is also very effective for athletes of all games and sports. Number of intervals depends upon athletes workout level immediate fitness level. There is no replanted duration or distance or number of intervals in this method. An average athlete may cover 20-40 kms **(Arvind Bahadur Singh 2012).**

The lipoproteins which are combinations of lipids and proteins are the form in which lipids are transported in the blood. The HDL cholesterol is therefore considered the good cholesterol. The higher the HDL cholesterol level, the lower the risk of coronary artery disease. The purpose of the study was to find out Individualized combined effects of brisk walking fartlek training on HDL and total cholesterol on untrained college men.

Methodology:-

To achieve the purpose of the present study sixty men subjects were selected from Rama Krishna Mission College of arts and science, Coimbatore, Tamil Nadu. The subjects age 18 to 21 years. They were divided to four groups namely group-I Brisk walking training group, (BWTG) group-II fartlek training group (FRKTG), group –III combined training group (Brisk walking with fartlek training group (CMBDTG) and group-IV acted as control group(CG). Each group consists of fifteen men subjects. The practice of brisk walking training was given for 12 weeks 3 days (Monday, wednes day and Friday) 12 weeks and morning 7.00 am to 8.00. The practice of fartlek training was given for 12 weeks 3 days (Monday, wednes day and Friday) 12 weeks and evening 5.00 pm to 6.00 pm. The practice of combined (brisk walking + fartlek training) were given for 12 weeks 3 days (Tuesday, Thursday and Saturday) 12 weeks and morning 7.00 am to 8.00. The control group did not participate any special activity apart from their regular activities. The training groups were High Density Lipo Proteins (HDL), Total Cholesterol assessed with (Enzymatic caloric method) lab test help of lab chemists. Pre and post test training data were

collected and treated with 't' test and Analysis of co variance. If results of 'F' is significant to find out paired mean difference post hoc test of scheffe's was used. The significant level was confirmed at 0.05.

Training Program

COMBINED TRAINING GROUP(Brisk Walk+ Fartlek Training)

Week	1	2	3	4	5	6	7	8	9	10	11	12
Walking	30 min	30	30	30	30	30	30	30	30	30	30	30
Fartlek	30 min	30	30	30	30	30	30	30	30	30	30	30

Rest / 30 seconds / set (5 minutes –Warm up, 5 minutes- cool down)

Brisk Walking Program

Week	1	2	3	4	5	6	7	8	9	10	11	12
Rep	8	8	7	7	6	6	5	5	4	4	3	3
Walking	5 Min	7	9	11	13	15	17	19	21	23	25	27
Intensity	55	55	55	60	60	60	65	65	65	70	70	70

Rest / 30 seconds / set (5 minutes –Warm up, 5 minutes- cool down)

Fartlek Training Group

Weeks	Training	Intensity		Volume	Duration of activity
1-3		60% -	110-120 bpm	6k	45min
4-6	Speed	65% -	120-130 bpm	6.5k	45min
7-9	Play	70% -	130-140 bpm	7k	45min
10-12		75% -	140-145 bpm	7.5k	45min

Results

TABLE-I
SIGNIFICANCE OF MEAN GAINS / LOSSES BETWEEN PRE TEST AND POST TEST ON HDL OF EXPERIMENTAL AND CONTROL GROUP OF UNTRAINED COLLEGE MEN

S.No	Variables	Pre test Mean (±SD)	Post test Mean (±SD)	MD	SE	't' ratio
1. BRISK WALKING TRAINING GROUP						
	HDL	41.2 ± 3.59	44.87 ± 3.44	3.67	0.41	8.95*
2. FARTLEK TRAINING GROUP						
	HDL	41.13 ± 3.62	45.00 ± 3.12	3.87	0.62	6.24*
COMBINED TRAINING GROUP						
3.	HDL	41.0 ± 3.87	46.0 ± 2.59	5.0	0.77	6.49*
4. CONTROL GROUP						
	HDL	41.33 ± 3.84	41.60 ± 4.20	0.27	0.50	0.54

significant at 0.05 level ('t' value 2.14) with df 14

Table-I shows that the pre and post mean and S.D values of brisk walking training group of HDL of mean values are 41.2 ± 3.59, 44.87 ± 3.44 and fartlek training group 41.13 ± 3.62, 45.0 ± 3.12 and combined training group 41.0 ± 3.87, 46.0 ± 2.59. The obtained 't' value of 8.95 , 6.24, 6.49 all three experimental groups greater than table the value of 2.14 with df 14. The pre and post test of control group mean and S.D values are 41.33 ± 3.84, 41.60 ± 4.20 The obtained 't' value of the control group is 0.54 lower than and table value of 2.14 which is insignificant.

TABLE-II
ANALYSIS OF COVARIANCE ON HDL OF EXPERIMENTAL
GROUPS AND CONTROL GROUP OF UNTRAINED
COLLEGE MEN

		Brisk Walking Training Group	Fartlek Training Group	Combined Group	Control Group	SOV	SS	df	M.S	'F' Ratio
Pre-test	$\bar{X}$	41.2	41.13	41.0	41.33	B	0.867	3	0.289	0.021
						W	781.467	56	13.955	
Post-test	$\bar{X}$	44.87	45.0	46.0	41.6	B	164.60	3	54.867	4.78*
						W	643.33	56	11.488	
Adjusted Post-test	$\bar{X}$	44.84	45.02	46.12	41.48	B	180.89	3	60.298	14.16*
						W	234.26	55	4.259	

(The table value for significance at 0.05 level of confidence with df 3 and 56 and 2 and 41 are 2.77 and 2.76, respectively).

It is clear from the table-II that the pre test ($F = 0.021$, $p > 0.05$) showed no significant difference in HDL. However, post test ($F = 4.78$ $p < 0.05$) and adjusted post test ($F = 14.16$, $p < 0.05$) value showed significant difference. The covariate is significant, indicating that HDL before training no significant improvement and after 12 weeks of effects of brisk walking, fartlek

training, combined training groups are because of significant improvement of HDL due to training effects as statistically proved. Since, adjusted post test mean also significant.

TABLE-III

## SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN THE ADJUSTED POST-TEST PAIRED MEANS OF HDL ON UNTRAINED COLLEGE MEN

Adjusted Post-test Means				Mean Differences	Confidence Interval
BWTG	FRKTG	CMBDTG	CG		
44.84	45.02	-	-	0.18	
44.84	-	46.12	-	1.28	
44.84	-	-	41.48	3.36*	
-	45.02	46.12	-	1.10	1.88
-	45.02	-	41.48	3.54*	
-	-	46.12	41.48	4.64*	

*significant with level of confidence 0.05

The table -III shows the adjusted post-test mean difference of HDL between brisk walking, fartlek and combined training groups compared with each other and control group. Combined training group 4.64, which were greater than 1.88 at 0.05 level of confidence.

The results of the study showed that, brisk walking training group, fartlek training group, combined training groups has significantly differed on HDL level when compared to control group, but between the training significant differences was found. Hence it was concluded that combined training group was better method to increase the HDL level of untrained college men.

FIGURE-1
MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP OF HDL ON UNTRAINED COLLGE MEN
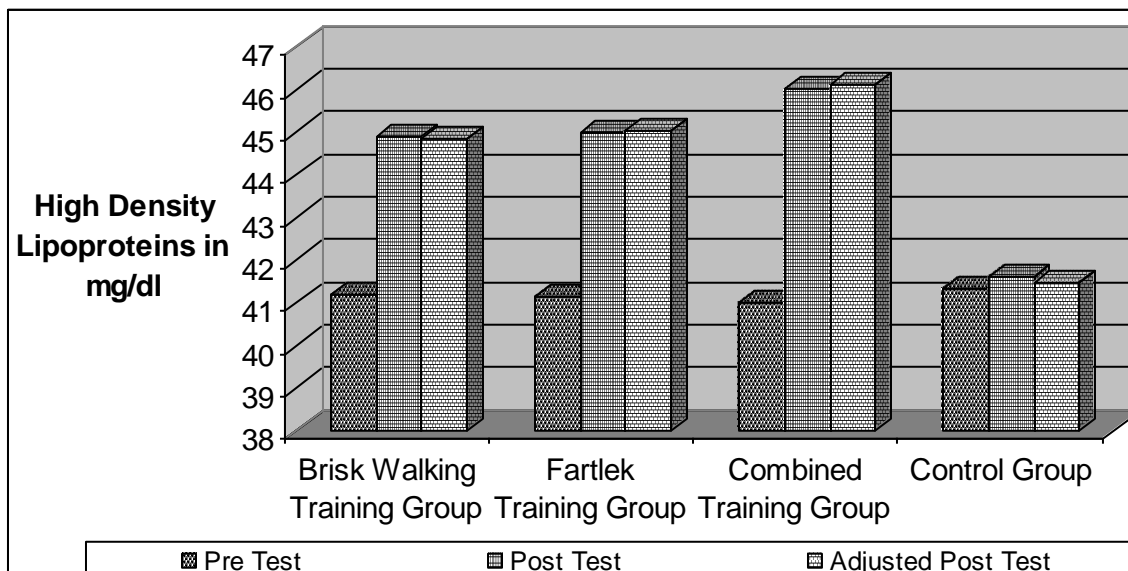
TABLE-IV
SIGNIFICANCE OF MEAN GAINS / LOSSES BETWEEN PRE TEST AND POST TEST ON TOTAL CHLOESTEROL OF EXPERIMENTAL AND CONTROL GROUP OF UNTRAINED COLLEGE MEN

S.No	Variables	Pre test Mean (±SD)	Post test Mean (±SD)	MD	SE	't' ratio
BRISK WALKING TRAINING GROUP						
1.	Total Cholesterol	188.4 ± 7.74	175.87 ± 6.64	12.53	2.38	5.26*
2. FARTLEK TRAINING GROUP						
	Total Cholesterol	188.27 ± 7.43	173.87± 5.29	14.4	1.71	8.42*
3.COMBINED TRAINING GROUP						
	Total Cholesterol	188.33 ± 6.99	172.27 ± 7.72	16.06	2.35	6.83*
4.CONTROL GROUP						
	Total Cholesterol	188.13 ± 4.90	188 .53± 7.43	0.40	2.38	0.17

significant at 0.05 level ('t' value 2.14) with df 14

Table-VI shows that the pre and post mean and S.D values of brisk walking training group of total cholesterol of mean values are 188.4 ± 7.74, 175.87 ± 6.64 and fartlek training group 188.27 ± 7.43, 173.87 ± 5.29 and combined training group 188.33 ± 6.99, 172.27 ± 7.72. The obtained 't' value of 5.26 , 8.42, 6.83 all three experimental groups greater than table the

value of 2.14 with df 14. The pre and post test of control group mean and S.D values are 188.13 ± 4.90, 188.53 ± 7.43 The obtained 't' value of the control group is 0.17 lower than and table value of 2.14 which is insignificant.

TABLE-V
ANALYSIS OF COVARIANCE ON TOTAL CHOLESTEROL OF EXPERIMENTAL TRAINING GROUPS AND CONTROL GROUP OF UNTRAINED COLLEGE MEN

		Brisk Walking Training Group	Fartlek Training Group	Combined Group	Control Group	SOV	SS	df	M.S	'F' Ratio
Pre-test	$\bar{X}$	188.4	188.27	188.33	188.13	B	0.583	3	0.194	0.004
						W	2573.6	56	45.957	
Post-test	$\bar{X}$	175.87	173.87	172.27	188.53	B	2473.80	3	824.60	17.64*
						W	2618.13	56	46.752	
Adjusted Post-test	$\bar{X}$	175.6	173.9	172.30	188.6	B	2485.74	3	828.58	18.12*
						W	2515.10	55	45.729	

(The table value for significance at 0.05 level of confidence with df 3 and 56 and 2 and 41 are 2.77 and 2.76, respectively).

It is clear from the table-V that the pre test ($F = 0.004$, $p > 0.05$) showed no significant difference in total cholesterol. However, post ($F = 17.64$ $p < 0.05$) and adjusted post test ($F = 18.12$, $p < 0.05$) value showed significant difference. The covariate is significant, indicating that total cholesterol before training no significant changes and after 12 weeks of effects of brisk walking, fartlek training, combined training groups are because of significant reduction of total cholesterol due to training effects as statistically proved. Since, adjusted post test mean also significant.

TABLE-VI
SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN THE ADJUSTED
**POST-TEST PAIRED MEANS OF TOTAL CHOLESTEROL**
ON UNTRAINED COLLEGE MEN

Adjusted Post-test Means				Mean Differences	Confidence Interval
BWTG	FRKTG	CMBDTG	CG		
175.6	173.9	-	-	1.70	
175.6	-	172.3	-	3.30	
175.6	-	-	188.6	13.0*	6.18
-	173.9	172.3	-	1.60	
-	173.9	-	188.6	14.7*	
-	-	172.3	188.6	16.3*	

* Significant at 0.05 level of confidence.

The table -VI shows the adjusted post-test mean difference of total cholesterol between brisk walking, fartlek and combined training groups compared with each other and control group. Combined training group 16.3, which were greater than 6.18 at 0.05 level of confidence.

The results of the study showed that, brisk walking training group, fartlek training group, combined training groups has significantly differed on total cholesterol level when compared to control group, but between the training significant differences was found. Hence it was concluded that combined training group was better method to reduce the total cholesterol level of untrained college men.

FIGURE-2
**MEAN VALUES OF EXPERIMENTAL GROUPS AND CONTROL GROUP OF
TOTAL CHLOESTEROL ON UNTRAINED COLLGE MEN**
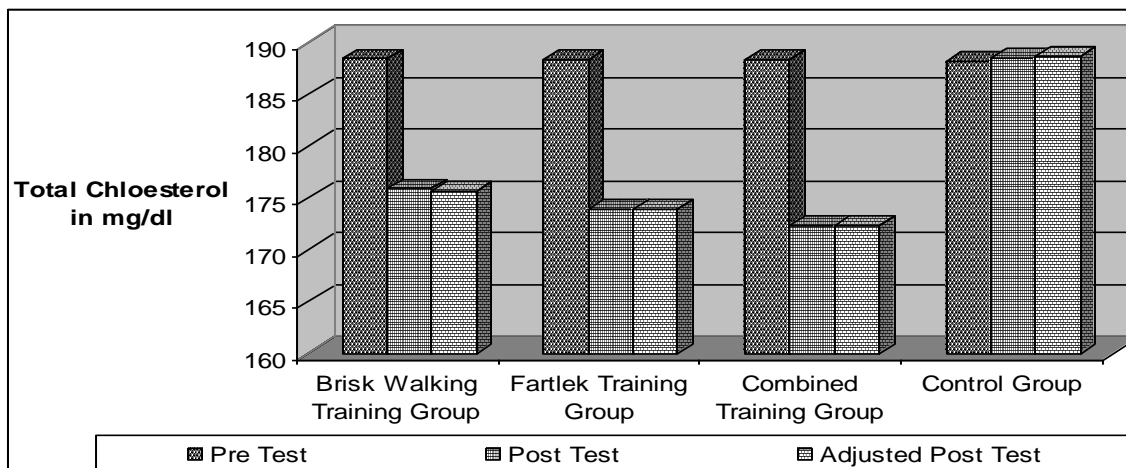
DISCUSSION ON FINDINGS

The results of the study results shows that the Individualized combined effects of brisk walking fartlek training on HDL and total cholesterol on untrained college men which involved various physical fitness exercises various intensities, on the untrained college men for twelve weeks of brisk walking, fartlek training had significantly improved on HDL and reduction on total cholesterol. The outcomes of the research are line with the results of other studies. Effect of an 8-week endurance training program on markers of antioxidant capacity in women (Heitkamp et al., 2008). Impact of progressive resistance training on lipids and lipoproteins in adults: a meta-analysis of randomized controlled trials (Kelley et al., 2008). Lipoprotein sub fraction changes after continuous or intermittent exercise training (Altena et al., 2006). Endurance exercise training raises high-density lipoprotein cholesterol and lowers small low-density lipoprotein and very low-density lipoprotein independent of body fat phenotypes in older men and women. Metabolism (Halverstadt et al., 2007).

Conclusions

➢ The training groups (Brisk, fartlek, and Combined training) had significantly the increased the HDL and significant reduction of total cholesterol of untrained college men.

➢ The combined training group better improvement of HDL and reduction of total cholesterol compared with other training groups.

➢ The control group did not change on selected HDL and total cholesterol.

References

1. Bompa TO. Periodization Training. In: Bompa TO, editor. Periodization Training for Sports. Champaign, IL: Human Kinetics; 1999. pp. 147–311.

2. Popadic Gacesa JZ, Barak OF, Grujic NG. Maximal anaerobic power test in athletes of different sport disciplines. J Strength Cond Res. 2009;23:751–5.

3. Degoutte F, Jouanel P, Begue RJ, et al. Food restriction, performance, biochemical, psychological, and endocrine changes in judo athletes. Int J Sports Med. 2006;27:9–18.

4. Heitkamp HC, Wegler S, Brehme U, et al. Effect of an 8-week endurance training program on markers of antioxidant capacity in women. J Sports Med Phy Fitness. 2008;48:113–9.

5. Kargotich S, Keast D, Goodman C, et al. Monitoring 6 weeks of progressive endurance training with plasma glutamine. Int J Sport Med. 2007;28:211–6.

6. Kelley GA, Kelley KS. Impact of progressive resistance training on lipids and lipoproteins in adults: a meta-analysis of randomized controlled trials. Prev Med. 2009;48:9–19.

7. Altena TS, Michaelson JL, Ball SD, Guilford BL, Thomas TR. Lipoprotein subfraction changes after continuous or intermittent exercise training. Med Sci Sports Exerc. 2006;38:367–72.

8. Halverstadt A, Phares DA, Wilund KR, et al. Endurance exercise training raises high-density lipoprotein cholesterol and lowers small low-density lipoprotein and very low-density lipoprotein independent of body fat phenotypes in older men and women. Metabolism. 2007;56:444–50.

9. Durstine JL, Davis PG, Ferguson MA, et al. Effects of short-duration and long-duration exercise on lipoprotein (a) Med Sci Sport Ex. 2001;33:1511–6.

10. Durstine JL, Grandjean PW, Cox CA, Thompson PD. Lipids, lipoproteins, and exercise. J Cardiopulm Rehabil. 2002;22:385–98.

11. Ajmer Singh, Essentials of Physical Education, Kalyani Publications, New Delhi.

12. Hardayal Singh (1991), Science of Sports Training, DVS Publications, New Delhi.

13. Arvind Bahadur Singh (2012), Sports Training, Prema Prakasan New Delhi.