



## COMPARISON BETWEEN YOGA PRACTICES AND CIRCUIT TRAINING ON RESTING HEART RATE AND PEAK FLOW RATE ON HOSTEL STUDENTS

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### ABSTRACT

The purpose of the current study was to Comparison between yoga practices and circuit training on peak flow rate on hostel students, 90 male students age group 15-17, from “greater valley school hostel” were randomly selected and divide them in three groups for a 12 week circuit training programme and yoga asana program, and one in control group which was 5 days a week, The selected dependent variable was the performance of participants in Peak Flow Meter. Pre- and post-test data was collected, on basis which “ANCOVA” was applied to identify difference between the groups. The level of significance was set at 0.05. A Significant differences was seen in the pre-post data as the p value obtained (0.011) was less than  $p < 0.05$ .

**KEYWORDS:** circuit training, yogic exercise , Resting Heart rate and peak flow rate.

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### INTRODUCTION

Circuit fitness exercises are a wonderful way to burn your fat and tone your body muscles, leaving you healthy and in a good

shape. Finding the perfect workout routines takes time and effort. These best workout routines is a great place to start if a person is interested in flat abs. All these activities

are healthy easier to perform and inexpensive. Circuit fitness exercises are beneficial in so many ways like Strengthening the respiratory muscles, Strengthening and enlarge the heart muscle and improve its pumping, Improving blood circulation and red blood cells, Reducing stress and depression Increasing your stamina and endurance of your muscles, In short it reduces the risk of heart attacks. Yoga is an ancient Indian way of life, which includes changes in mental attitude, diet, and the practice of specific techniques such as yoga asanas (postures), breathing practices (pranayamas), and meditation to attain the highest level of consciousness. Circuit training is a form of exercise that uses a number of exercise sets separated by short intervals. The cardiovascular effort to recover from each set serves a function similar to an circuit fitness exercise, but this

is not the same as saying that a weight training set is itself an circuit fitness process. Resting heart rate “RHR is the number of times your heart beats per minute while you're at rest. If you have a diagnosed heart condition, factors such as your medications and the nature of your heart problem may influence your RHR. For the rest of us, RHR can provide a rough snapshot of how well heart muscle is functioning; Peak Expiratory Flow Rate (PEFR) is the maximal expiratory flow rate achieved and this occurs very early in the forced expiratory maneuver. The peak expiratory flow rate measures how fast a person can breathe out (exhale) air. It is one of many tests that measures how well your airways work. It is a simple method of measuring airway obstruction and it will detect moderate or severe disease.

### Program Used for Circuit Training

S/N	Exercise s	1st to 3rd Weeks				4th to 6th Weeks				7th to 9th Weeks				10th to 12th Weeks			
		Durati on (in sec)	N o. of sets	Intens ity (in %)	Recov ery between sets (in min)	Durati on (in sec)	N o. of sets	Intens ity (in %)	Recov ery between sets (in min)	Durati on (in sec)	N o. of sets	Intens ity (in %)	Recov ery between sets (in min)	Durati on (in sec)	N o. of sets	Intens ity (in %)	Recov ery between sets (in min)
1	lunging	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6
2	Push-ups	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6
3	Sit-ups	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6
4	Double knee jumps	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6
5	Squat Thrust	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6
6	Skipping	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6
7	Interval Running	45	2	40-50	3-5	60	2	50-60	3-5	75	3	60-70	4-6	90	3	70-80	4-6

### Program used for yoga training

Sr. No.	Name of event	Time allotted
1.	Om Chanting	2 minutes
2.	Stretching	3 minutes
3.	Surya Namaskar	5 minutes

4.	Asana 1. Pashimottanasana 2. Bhujangasana 3. Halasana 4. minutes 5. Ardhamasendrasana 6. Hanuman Asana Sharvangasana Garudasana 7. Padmasana/ Simhasana 8.	25
5.	Pranayama <input type="checkbox"/> Rechaka <input type="checkbox"/> Kumbaka <input type="checkbox"/> Puraka <input type="checkbox"/> Kapalvati <input type="checkbox"/> Bhastika <input type="checkbox"/> Anulomaviloma	10 minutes
6	Relaxation ( Savasana)	5 minutes
Total		50 minutes

To locate the real effect of Yoga Exercise and circuit training on peak flow rate on School Hostel Students.

## REVIEWS

S.N O.	TITLE	VARIABLES	STATISTICAL TECHNIQUES/TOOLS	FINDINGS	AUTHOR
1	The effect of continuous running and interval running on cardio respiratory endurance, speed, agility and muscular endurance.	cardio respiratory endurance, speed, agility and muscular endurance	cardio respiratory endurance was measured by cooper's 12 minutes run/walk test, speed was measured by 50 meter run, agility was measured by 4 ×10 shuttle run and muscular endurance was measured by number of sit-ups per minutes	findings of the study showed that the both the training groups improved the cardiorespiratory endurance and muscular endurance. Since the interval running improves the performance rapidly that of continuous running. The interval running group showed a significant difference when compare to continuous running and control group on selected criterion variables.	<b>Chidambaramararaja (1992)</b>
2	a study to investigate the effect of training and	physical and physiological			<b>Vaithiana than</b>

	after on selected physical and physiological variables	variables	muscular strength was measured by pull-ups, muscular endurance was measured by sit-ups, cardio respiratory endurance was measured by cooper's 12 minutes run/walk test, blood pressure was measured by stethoscope, vital capacity	study showed that the circuit training improved the efficiency significantly in physical fitness variables	
3	a study to investigate the effect of varied packages of physical training for preparatory and competitive periods on selected motor ability	components, physiological variables, speed	endurance were measured by counting the pulse per minute, MargariaKalaman test and 12 minutes run and walk test respectively	The package I, package II and package III experimental groups training have significantly improved the speed, flexibility, resting pulse rate, anaerobic power, 30 metres run performance from	<b>maniant Amizhappan (2010)</b>
	physiological variables, speed parameters and hundred meters run performance of school		metres run performance when compared to control group		
4	To find out the effect of fartlek training and interval running on cardio-respiratory endurance among college men athletes (runners)	Fartlek training and interval running were selected as independent variables and the following dependent variable is cardio respiratory endurance.	Analysis of covariance	It was concluded that there was a significant improvement on cardio respiratory endurance due to Fartlek training and interval running when compared to the control group among the athletes (runners) and fratelek training outperformed than interval running towards improving cardio respiratory endurance.	<b>Grishkumar and Thakkar (2012)</b>
5	study to determine the effect of intensive interval training and fartlek training on cardio respiratory endurance and speed endurance of team game players	cardio respiratory endurance and speed endurance	The criterion variable cardio respiratory endurance and speed endurance was measured before and after the completion of trainingprogrammes	it was found that fartlek training group had significant effect on cardio respiratory endurance and intensive interval training had shown significant effect on speed endurance training	<b>Jayasivaranjan and Vasanthi (2011)</b>

6	a study to investigate the effect of continuous running, yogic pranayama and combination of continuous running and yogic pranayama exercise on cardio respiratory endurance, selected physiological and psychological variables	cardio respiratory	self confidence	The results shown that the yogic pranayama practice group and the combination of continuous running & yogic pranayama groups when compared to the continuous running group and control group significantly improved dependent variables namely such as cardio respiratory endurance, forced vital capacity, forced expiratory volume in first second, peak expiratory flow rate, maximum expiratory pressure, maximum inspiratory pressure, 40 mm Hg, self confidence, mental health and state anxiety.	Sakthign
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## METHODOLOGY

### Selection of Subjects

To accomplish the result of the research study a total of 90 school students were selected from various standards, further after the selection, all the subjects were categorized into three groups i.e. (30 students in yoga group, 30 students in control group, and 30 students for circuit training group, which were preferred by the lottery procedure from the school located at Noida.

### Selection of Variables

Keeping in mind the feasibility criteria and specific purpose of the study. *Peak flow Rate and Resting heart rate* was analyzed by the Peak flow meter performance and recorded as fitness index score.

### Analysis of Data

Statistical analysis was done using ANCOVA paired means methods. The level of significance was set at 0.05 percent.

## FINDINGS

TABLE 1. Descriptive statistics of both observations (Pre test and Post test) among the three treatment groups (Ashtanga Yoga, Circuit Training and Control group) in Resting Heart Rate.

Observations	Treatment	Mean	S.D.	Value of	Mean (95%	Min	Max	
	Groups	Value	value	S.E. of	Confidence	Value	Value	
				mean	Interval)			
Pre Test	Ashtanga	81.36	1.71	.312	80.72	82.00	78.00	84.00
	Yoga							
	Circuit	81.23	1.63	.298	80.62	81.84	79.00	84.00
	Training							
Control								

	<b>group</b>	81.03	1.75	.319	80.37	81.68	78.00	84.00
<b>Post Test</b>	<b>Ashtanga</b>	80.63	1.60	.293	80.03	81.23	78.00	83.00
	<b>Yoga</b>							
	<b>Circuit</b>	80.33	2.35	.427	79.45	81.21	75.00	84.00
	<b>Training</b>							
	<b>Control</b>	81.36	1.84	.337	80.67	82.05	78.00	84.00
<b>group</b>								

“TABLE 4” is related to the descriptive statistics of two observations (Pre test & Post test) among three treatment groups (Ashtanga Yoga, Circuit Training, Control group) in resting heart rate. In case of 1st observation (Pre test) in Ashtanga Yoga group, observed value of mean, standard deviation, standard error of mean, lower and upper bound of

95 percent confidence interval for mean, minimum value and maximum value were 81.36, 1.711, .312, 80.72, 82.005,

78.00, 84.00 respectively. In case of 1st observation (Pre test) in Circuit Training group, observed value of mean, standard deviation, standard error of mean, lower and upper bound of 95 percent confidence interval for mean, minimum value and maximum value were 81.2333, 1.63335, .29821, 80.6234, 81.8432, 79.00, 84.00 respectively. In case of 1st observation (Pre test) in Control group, observed value of mean, standard deviation, standard error of mean, lower and upper bound of 95 percent confidence interval for mean, minimum value and maximum value were 81.03, 1.75, .31, 80.37, 81.68, 78.00, 84.00 respectively. In case of 2nd observation (Post test) in Ashtanga Yoga group, observed value of mean, standard deviation, standard error of mean, lower and upper bound of 95 percent confidence interval for mean, minimum value and maximum value were 80.63,

1.60, .293, 80.03, 81.23, 78.00, 83.00 respectively. In case of 2nd observation (Posttest) in Circuit Training group, observed value of mean, standard deviation, standard error of mean, lower and upper bound of

95percentconfidence interval for mean, minimum value and maximum value were 80.33, 2.35, .42, 79.45, 81.21,

75.00, 84.00 respectively. In case of 2nd observation (Post test) in Control group, observed value of mean, standard deviation, standard error of mean, lower and upper bound of 95 percent confidence interval for mean, minimum value and maximum value were 81.36, 1.84, .337, 80.67, 82.05, 78.00, 84.00 respectively.

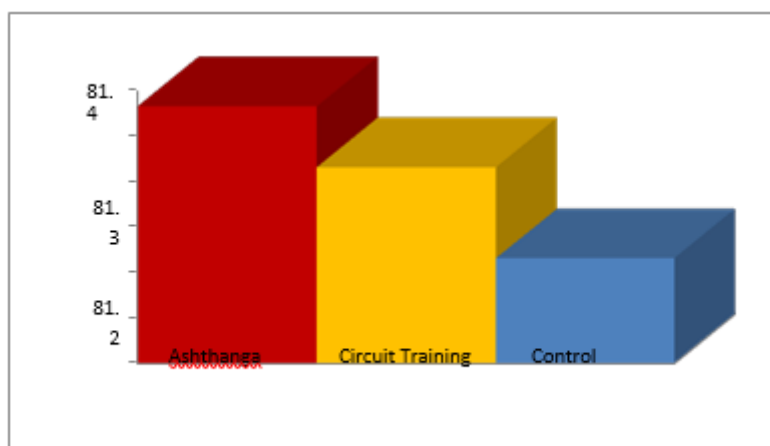


FIGURE 1. Comparison of Pre test means among three treatment groups in relation to Resting Heart Rate.

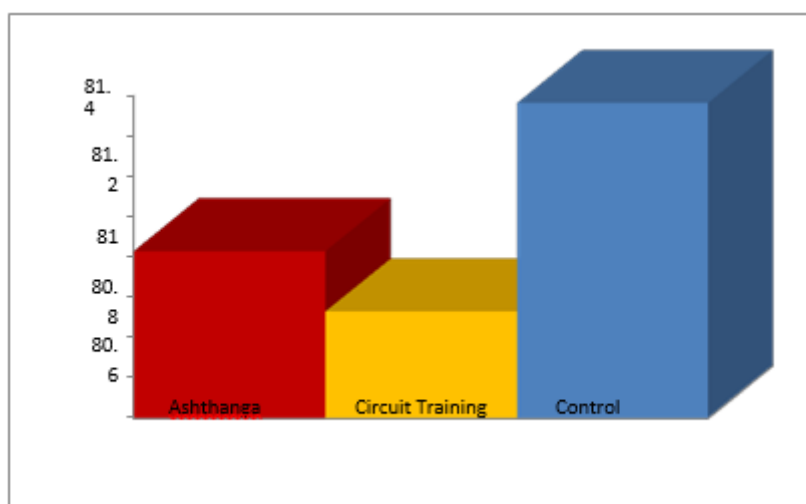


FIGURE 2. Comparison of Post test means among three treatment groups in relation to Resting Heart Rate.

TABLE 2. Analysis of Covariance outcome to the effect of Ashtanga Yoga and Circuit Training on resting heart rate

Source	Df	Sum of squares	Mean Square	F	Sig.	Partial Eta squared
Corrected model	3	54.66	18.21	5.27	.002	0.71
Intercept	1	92.65	92.65	26.83	.000	
Pre resting	1	37.69	37.66	10.92	.001	
Groups	2	20.30	10.15	2.94	.058	

Error	86	296.90	3.45			
Total	90	587606.00				
Corrected total	89	351.55				

Adjusted R squared .126.

“TABLE 2” shows the F value of 2.94 which is found significant at 0.05 level of significance. Value of partial Eta squared

0.718 that shows that 71% change in Resting Heart rate is due to treatments (Ashtanga Yoga and Circuit Training).

TABLE 3. Comparison of paired means of two treatment groups (Ashtanga Yoga and Circuit Training) and control group in Resting Heart Rate

	(j)group	The Mean	Standar	Significant	Lower	Upper
	difference(i-j)		Error	value	bound	bound
control	Ashtanga yoga group	.862	.481	.057	.094	1.81
	Circuit training group	1.11	.480	.023	.156	2.06
Ashtanga yoga group	Control	.862	.481	.057	1.81	.094
Circuit training group		.248	.480	.606	.706	1.20
Circuit training group	Control	1.11	.480	.023	2.06	.159
Ashtanga yoga group		.248	.480	.606	1.20	.706

Significant level- at 0.05

In table 3, the result of paired mean of resting heart rate of control group and ashtanga yoga group is  $p < 0.05$  and the result of paired mean of resting heart rate of control group and circuit training is  $p < 0.05$  and the result of paired mean of resting heart rate of ashtanga yoga and circuit

training is  $p > 0.05$ . Significant difference was found between control group and ashtanga yoga, control group and circuit training And ashtanga yoga and circuit training was found in significant in paired mean of resting heart rate.

Table-4: The Descriptive statistics of both observations (Pre test and Post test) among the three treatment groups (Ashtanga Yoga, Circuit Training and Control group) in Peak Flow Rate

Observations	Treatment Groups	Mean Value	S.D. value	Value of S.E. of mean	Mean (95% Confidence Interval)		Min Value	Max Value
Pre Test	Ashtanga Yoga	362.07	20.09	3.66	354.56	369.57	334.00	399.00
	Circuit Training	365.53	22.22	4.05				



					357.23	373.83	331.00	397.00
	<b>Control group</b>	364.20	22.26	4.06	355.88	372.51	310.00	402.00
<b>Post Test</b>	<b>Ashtanga Yoga</b>	379.07	29.88	5.45	367.90	390.22	340.00	450.00
	<b>Circuit Training</b>	384.10	26.18	4.78	374.32	393.87	330.00	428.00
	<b>Control group</b>	375.96	27.07	2.85	370.28	381.62	320.00	450.00

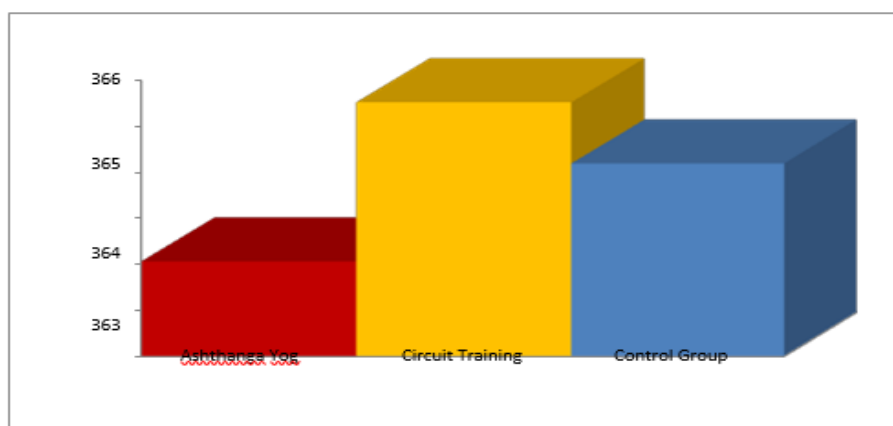


FIGURE 3. Comparison of Pretest means among three treatment groups in relation to Peak Flow Rate.

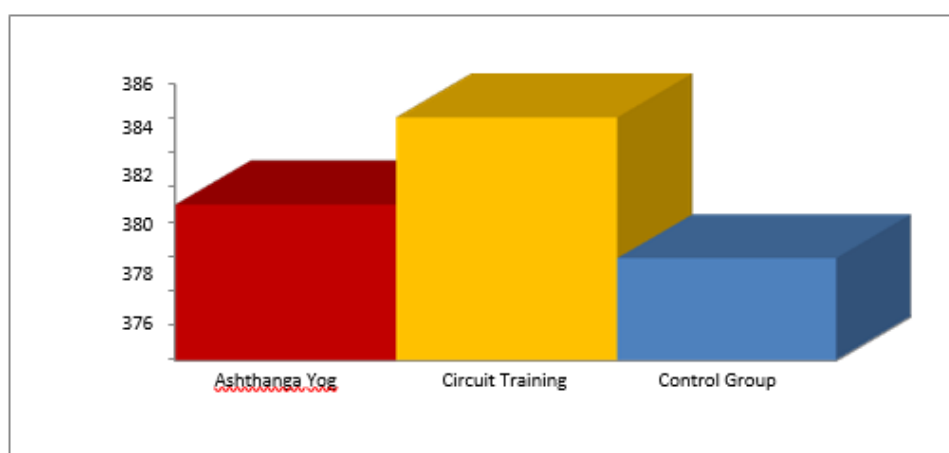


FIGURE 4. Comparison of Post test means among three treatment groups in relation to Peak Flow Rate.

TABLE 5. Analysis of Covariance outcome to the effect of Ashtanga Yoga and Circuit Training on Peak flow rate

Source	Df	Sum of square	Mean Square	F	Sig.	Partial Eta squared
Corrected model	3	10445.44	3481.81	5.46	.002	0.791
Intercept	1	1.27	1.27	1.99	.000	
Pre resting	1	4428.03	4428.03	6.94	.010	
Groups	2	6017.41	3008.70	4.72	.011	
Error	86	54810.37	637.33			
Total	90	1.27				
Corrected total	89	65255.82				

“TABLE 5” shows the F value of 4.72 which is found significant at 0.05 level of significance. Value of partial Eta squared

0.791 that shows that 79% change in Peak flow rate is due to treatments (Ashtanga Yoga and Circuit Training).

TABLE 6. Comparison of paired means of two treatment groups (Ashtanga Yoga and Circuit Training) and control group in Peak Flow Rate.

(i)group	(j) The mean difference (i-j)	Standar error	Significan value.	Lower bound	Uppe boun
Control group Ashtanga yoga group	15.06	6.52	.023	28.03	2.09
	18.96	6.52	.005	31.92	6.00
Ashtanga yoga group Control	15.06	6.52	.023	2.09	28.03
Circuit training group Control group	3.89	6.53	.553	16.88	9.09
	18.96	6.52	.005	6.00	31.92
	3.894	6.53	.553	9.09	16.88

In table 6, the result of paired mean of Peak flow rate of control group and ashtanga yoga group is  $p < 0.05$  and the result of paired mean of Peak flow rate of control group and circuit training is  $p < 0.05$  and the result of paired mean of Peak flow rate of ashtanga yoga and circuit training is  $p > 0.05$ . Significant difference was found between control group and ashtanga yoga, control group and circuit training, And ashtanga yoga and circuit training was found in significant in paired mean of Peak flow rate.

## CONCLUSIONS

On the basis of the finding and within the limitations of the study, it was observed that Practice of ashtanga yoga and circuit training helped to improved physiological Variables. It was seen that there was progressively improved in some physiological Variables of experimental groups of school students after twelve Weeks of practice.

Following conclusions were drawn for this study.

### Resting Heart Rate

Ashtanga yoga and Circuit training were found effective in bringing change in Resting heart rate. And also found that the circuit training is more effective in comparison to Ashtanga yoga.

### Peak Flow Rate

Ashtanga yoga and Circuit training were found effective in bringing change in peak Flow rate. And also found that the circuit training is more effective in comparison to Ashtanga yoga.

S.No.	Variables	Effect of Ashtanga Yoga	Effect of Circuit Training	Effect of Comparison
1.	Resting Heart Rate	Effect Found	Effect Found	
		The circuit training hear is more effective than Ashtanga yoga		

The circuit training hear is more effective than Ashtanga yoga

### Peak Flow Rate

Ashtanga yoga and Circuit training were found effective in bringing change in peak Flow rate. And also found that the circuit training is more effective in comparison to Ashtanga yoga.

S.No.	Variables	Effect of Ashtanga Yoga
	Peak flow rate	Effect Found
	Effect of Circuit Training	Comparison
	Effect Found	The circuit training hear is more effective than Ashtanga Yoga

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