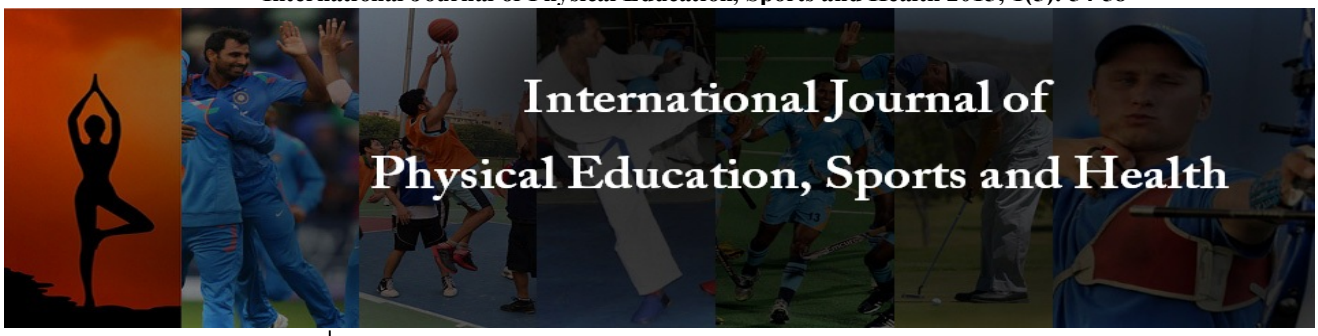

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Weight training and yoga on the adolescent school going students on their health related physical fitness

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Abstract
One hundred fifty students acted as subjects for the study and were included in three groups i.e., two experimental groups (weight training and yoga) and the control group, each consisting of 50 students. The pre- test and pot test of the experimental groups after six week training were compared and the result indicated that both the experimental groups showed significant increase in performance of all the health related fitness variables under study, compared to those of control group. But the yoga group showed significantly better gain in performance of subjects in one mile run and tricep skin fold measurement than the weight training group. The results of the study coincided with the general conception that yogic exercises improve cardio-vascular endurance and weight training helps improve agility, muscular strength and endurance of the players in a progressive manner.

Keywords: *Weight Training, Yoga, Health Related Physical Fitness*

Introduction
The process of empowering adolescents begins with the practice of treating them with respect and facilitating their growth in such a way that they are able to realize their hidden potential. The adolescent period exhibit tremendous changes on physiological, psychological aspects of the individual and continues to transform a young person to reach in to adulthood. It is a phase of life where the youths require maintaining physical and mental fitness to facilitate proper growth. Inclusion of fitness programmes including weight training and practice of yoga in school physical education programmes may lead the young boys and girls towards there fullest growth. Capen (1950) [2], Wilkins (1952) [4] investigated whether with heavy exercise of the resistance type causes an incipient muscle bound condition, and concluded that Muscular strength improves significantly along with muscular power and endurance of the students. Gharote (1974) [3] in his study found that Yogic exercises improve strength and endurance of young students. Bera and Rajapurkar (1993) [1] revealed that Yoga contributed to the improvement in ideal body weight, body density, cardiovascular endurance and anaerobic power of 12 to 15 years age group of school students.

Methodology
The purpose of this study was to determine the effect of a yogic exercise programme and Weight Training programme on Health Related Physical Fitness of Adolescent School Students. One hundred fifty school going adolescent students, age ranging between 13 to 15 years were taken as subjects and randomly assigned into three groups i.e., two experimental groups weight training and yoga group and the control group, each consisting of 50 students. All the 3 groups were being exposed to a pre-test of Health Related Physical Fitness variables such as Abdominal Muscle Strength (Sit Up), Flexibility (Sit And Reach), Cardiovascular Endurance (1 Mile Run), Body Fat % (Tricep And Sub-Scapular Skinfold). After competition 6 weeks training of the experimental groups, all the subjects went through a post test on stated variables.

Table 1: Significance Of Difference Between Pre-Test And Post-Test Means Of The Two Experimental Groups And The Control Group In Sit Up

Groups	Pre-test mean±SE	Post-test mean±SE	Difference between mean	SE	't' ratio
Wt. Training Group	16.38±0.71	17.28±0.60	0.90	0.205	4.400*
Yoga Group	16.20± 0.77	17.14± 0.67	0.94	0.205	4.589*
Control Group	16.26± 0.77	16.40± 0.74	0.14	0.121	1.155

* Significant at 0.05 level of confidence ('t' $_{0.05}$ (49) = 2.010)

Table 1 reveals that both the experimental groups improved significantly yielding 't' value of 4.400 and 4.589 whereas, control group did not show any significant improvement in sit up performance. It was found that the differences between the means existed and the experimental groups improved and no significant change was observed in the control group. As the experimental groups showed a significant increase, the data were analysed by applying analysis of variance and co-variance to find out if there was significant differences among the groups in Table 2.

Table 2: Analysis Of Variance and Covariance of the Means of Two Experimental Groups and the Control Group in Sit Up

Test	Wt. Training Group	Yoga Group	Control Group	Sum of squares	df	Mean square	F ratio
Pre-test means	16.38± 0.71	16.20± 0.77	16.26± 0.77	B 0.840 W 4133.400	2 147	0.430 28.118	0.015
Post-test means	17.28± 0.60	17.14± 0.67	16.40± 0.74	B 22.360 W 3348.100	2 147	11.180 22.776	0.491
Adjusted post-test means	17.19± 0.16	17.21± 0.16	16.42± 0.16	B 20.482 W 177.592	2 146	10.241 1.216	8.419*

* Significant at 0.05 level of confidence, N=150, B=between group variance, W= within group variance

The analysis of covariance for sit up performance showed that the resultant 'F' ratio of 0.015 was not significant in case of pre-test means. The post test yielded 'F' ratio of 0.491, which was not significant. However, the adjusted post test means yielded the 'F' ratio of 8.419, which was found to be significant. The 'F' ratio, needed for significance at 0.05 level of confidence (df 2, 147) was 2.996. As differences between adjusted final means for the groups were found significant, the critical differences for adjusted means was applied to find out which of the differences were most significant are shown in Table 3.

Table 3: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and the Control Group in Sit Up

Wt. Training Group	Yoga Group	Control Group	Difference between means	Critical differences for adjusted mean
17.19	17.21		0.02	0.473
17.19		16.42	0.77*	0.473
	17.21	16.42	0.79*	0.473

* Significant at 0.05 level of confidence

It was clear from the Table 3 that, the mean difference with respect to performance in sit up of weight training group and yoga group was found to be significantly greater than that of control group. No significant difference between both experimental groups was found with respect to sit up performance.

Table 4: Significance Of Difference between Pre-Test and Post-Test Means of the Two Experimental Groups and the Control Group in Sit and Reach Test

Groups	Pre-test mean±SE	Post-test mean±SE	Difference between mean	SE	't' ratio
Wt. Training Group	9.80±0.43	11.31±0.43	1.51	0.107	14.112*
Yoga Group	9.88±0.53	11.41±0.47	1.53	0.140	10.928*
Control Group	9.69±0.64	9.89±0.60	0.20	0.122	1.629

* Significant at 0.05 level of confidence ('t' $_{0.05}$ (49) = 2.010)

Table 4 reveals that both the experimental groups improved significantly yielding 't' value of 14.112 and 10.928 whereas, control group did not show any significant improvement in sit and reach test performance. It was found that the differences between the means existed and the experimental groups improved and no significant change was observed in the control group. As the experimental groups showed a significant increase, the data were analysed by applying analysis of variance and co-variance to find out if there was significant differences among the groups (Table 5).

Table 5: Analysis Of Variance and Covariance of the Means of Two Experimental Groups and the Control Group in Sit and Reach

Test	Wt.Training Group	Yoga Group	Control Group	Sum of squares	df	Mean square	F ratio
Pre-test means	9.80±0.43	9.88±0.53	9.69±0.64	B 0.883 W 2151.246	2 147	0.441 14.634	0.030
Post-test means	11.31±0.43	11.41±0.47	9.89±0.60	B 72.300 W 1878.966	2 147	36.150 12.782	2.828
Adjusted post-test means	11.29±0.98	11.33±0.98	9.98±0.98	B 59.116 W 69.506	2 146	29.558 0.476	62.088*

* Significant at 0.05 level of confidence, N=150, B=Between group variance, W=Within group variance

The analysis of covariance for sit and reach performance showed that the resultant 'F' ratio of 0.030 was not significant in case of pre-test means. The post test yielded 'F' ratio of 2.828, which was not significant. However, the adjusted post test means yielded the 'F' ratio of 62.088, which was found to be significant. The 'F' ratio, needed for significance at 0.05 level of confidence (df 2, 147) was 2.996. As differences between adjusted final means for the groups were found significant, the critical differences for adjusted means was applied to find out which of the differences were most significant. Differences between the paired adjusted final means are shown in Table 6.

Table 6: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and the Control Group in Sit and Reach Test

Wt. Training Group	Yoga Group	Control Group	Difference between means	Critical differences for adjusted mean
11.29	11.33		0.04	0.467
11.29		9.98	1.31*	0.467
	11.33	9.98	1.35*	0.467

* Significant at 0.05 level of confidence

It was clear from the Table 6 that, the mean difference with respect to performance in sit and reach of weight training group and yoga group was found to be significantly greater than that of control group. No significant difference between both the experimental groups was found with respect to sit and reach performance.

Table 7: Significance Of Difference Between Pre-Test and Post-Test Means of the Two Experimental Groups and the Control Group in One Mile Run

Groups	Pre-test mean±SE	Post-test mean±SE	Difference between mean	SE	't' ratio
Wt. Training Group	9.89±0.18	9.17±0.15	0.72	0.084	8.475*
Yoga Group	9.86±0.19	8.75±0.17	1.11	0.115	9.656*
Control Group	10.06±0.18	10.04±0.18	0.02	0.032	0.691

* Significant at 0.05 level of confidence ('t' $_{0.05}$ (49) = 2.010)

Table 7 reveals that both the experimental groups improved significantly yielding 't' value of 8.475 and 9.656 whereas, control group did not show any significant improvement in one mile run performance of subjects indicating 't' values of 0.691. It was found that the differences between the means existed and the experimental groups improved and no significant change was observed in the control group. As the experimental groups showed a significant increase, the data were analysed by applying analysis of variance and co-variance to find out if there was significant differences among the groups (Table 8).

Table 8: Analysis Of Variance and Covariance of the Means of Two Experimental Groups and the Control Group in One Mile Run

Test	Wt.Training Group	Yoga Group	Control Group	Sum of squares	df	Mean square	F ratio
Pre-test means	9.89±0.18	9.86±0.19	10.06±0.18	B 1.143 W 255.960	2 147	0.571 1.741	0.328
Post-test means	9.17±0.15	8.75±0.17	10.04±0.18	B 42.944 W 199.936	2 147	21.472 1.360	15.787*
Adjusted post-test means	9.21±0.08	8.81±0.08	9.94±0.08	B 32.728 W 40.817	2 146	16.364 0.280	58.534*

* Significant at 0.05 level of confidence, N=150, B=Between group variance, W=Within group variance

The analysis of covariance for one mile run performance showed that the resultant 'F' ratio of 0.328 was not significant in case of pre-test means. The post test means and adjusted post test means yielded 'F' ratio of 15.787 and 58.534, which were found to be significant. The 'F' ratio, needed for significance at 0.05 level of confidence (df 2, 147) was 2.996. As differences between adjusted final means for the groups were found significant, the critical differences for adjusted means was applied to find out which of the differences were most significant (Table 9).

Table 9: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and the Control Group in One Mile Run

Wt. Training Group	Yoga Group	Control Group	Difference between means	Critical differences for adjusted mean
9.21	8.81		0.40*	0.373
9.21		9.94	0.73*	0.373
	8.81	9.94	1.13*	0.373

* Significant at 0.05 level of confidence

It was clear from the Table 9 that, the mean difference with respect to performance in one mile run of weight training group and yoga group was found to be significantly greater than that of control group. Further, significant difference between both the experimental groups was found, making yoga group better than the weight training group with respect to one mile run.

Table 10: Significance Of Difference between Pre-Test and Post-Test Means of the Two Experimental Groups and the Control Group in Tricep Skin Fold

Groups	Pre-test mean±SE	Post-test mean±SE	Difference between mean	SE	't' ratio
Wt. Training Group	14.32± 0.37	13.58± 0.28	0.74	0.130	5.678*
Yoga Group	14.42± 0.38	13.26± 0.27	1.16	0.149	7.762*
Control Group	14.84±0.35	14.86± 0.28	0.02	0.112	0.178

* Significant at 0.05 level of confidence ('t' $_{0.05}$ (49) = 2.010)

Table 10 reveals that both the experimental groups improved significantly yielding 't' value of 5.678 and 7.762 whereas, control group did not show any significant improvement in tricep skin fold measurement of subjects indicating 't' values of 0.178.It was found that the differences between the means

existed and the experimental groups improved and no significant change was observed in the control group. As the experimental groups showed a significant increase, the data were analysed by applying analysis of variance and co-variance to find out if there was significant differences among the groups (Table 11).

Table 11: Analysis Of Variance and Covariance of the Means of Two Experimental Groups and the Control Group in Tricep Skin Fold

Test	Wt.Training Group	Yoga Group	Control Group	Sum of squares	df	Mean square	F ratio
Pre-test means	14.32±0.37	14.42±0.38	14.84±0.35	B 7.613 W 973.780	2 147	3.807 6.624	0.575
Post-test means	13.58±0.28	13.26±0.27	14.86±0.28	B 71.680 W 577.820	2 147	35.840 3.931	9.118*
Adjusted post-test means	13.73±0.09	13.34±0.09	14.63±0.09	B 43.658 W 57.021	2 146	21.829 0.391	55.892*

* Significant at 0.05 level of confidence, N=150, B=Between group variance, W=Within group variance

The analysis of covariance for tricep skin fold measurement showed that the resultant 'F' ratio of 0.575 was not significant in case of pre-test means. The post test means and adjusted post test means yielded 'F' ratio of 9.118 and 55.892, which were found to be significant. The 'F' ratio, needed for significance at 0.05 level of confidence (df 2, 147) was 2.996. As differences between adjusted final means for the groups were found significant, the critical differences for adjusted means was applied to find out which of the differences were most significant (Table 12).

Table 12: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and the Control Group in Tricep Skin Fold

Wt. Training Group	Yoga Group	Control Group	Difference between means	Critical differences for adjusted mean
13.73	13.34		0.39*	0.773
13.73		14.63	0.90*	0.773
	13.34	14.63	1.29*	0.773

* Significant at 0.05 level of confidence

It was clear from the Table 12 that, the mean difference with respect to tricep skin fold measurement of weight training group and yoga group was found to be significantly greater than that of control group. Further, significant difference between both the experimental groups was found, making yoga group better than the weight training group with respect to tricep skin fold.

Table 13: Significance Of Difference Between Pre-Test and Post-Test Means of the Two Experimental Groups and the Control Group in Sub Scapular Skinfold

Groups	Pre-test mean±SE	Post-test mean±SE	Difference between mean	SE	't' ratio
Wt. Training Group	15.36± 0.33	14.20± 0.27	1.16	0.132	8.785*
Yoga Group	15.46± 0.33	14.12± 0.24	1.34	0.177	7.548*
Control Group	15.32±0.37	15.30± 0.32	0.02	0.097	0.207

* Significant at 0.05 level of confidence ('t' $_{0.05}$ (49) = 2.010)

Table 13 reveals that both the experimental groups improved significantly yielding 't' value of 8.785 and 7.548 whereas, control group did not show any significant improvement in sub scapular skin fold measurement of subjects indicating 't' values of 0.207. With respect to sub scapular skin fold measurement, it was found that the differences between the means existed and the experimental groups improved and no significant change was observed in the control group. As the experimental groups showed a significant increase, the data were analysed by applying analysis of variance and co-variance to find out if there was significant differences among the groups (Table 14).

Table 14: Analysis Of Variance and Covariance of the Means of Two Experimental Groups and the Control Group in Sub-Scapular Skin Fold

	Wt. Training Group	Yoga Group	Control Group	Sum of squares	df	Mean square	F ratio
Pre-test means	15.36±0.33	15.46±0.33	15.32± 0.37	B 0.520 W 868.820	2 147	0.260 5.910	0.044
Post-test means	14.20±0.27	14.12±0.24	15.30±0.32	B 43.480 W 571.780	2 147	21.740 3.890	5.589*
Adjusted post-test means	14.22±0.11	14.06±0.11	15.35±0.11	B 49.158 W 87.222	2 146	24.519 0.597	41.143*

* Significant at 0.05 level of confidence, N=150, B=Between group variance, W=Within group variance

The analysis of covariance for sub scapular skin fold measurement showed that the resultant 'F' ratio of 0.044 was not significant in case of pre-test means. The post test means and adjusted post test means yielded 'F' ratio of 5.589 and 41.143, which were found to be significant. The 'F' ratio, needed for significance at 0.05 level of confidence (df 2, 147) was 2.996. As differences between adjusted final means for the groups were found significant, the critical differences for adjusted means was applied to find out which of the differences were most significant (Table 15).

Table 15: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and the Control Group in Sub Scapular Skin Fold

Wt. Training Group	Yoga Group	Control Group	Difference between means	Critical differences for adjusted mean
14.22	14.06		0.16	0.479
14.22		15.35	1.13*	0.479
	14.06	15.35	1.29*	0.479

* Significant at 0.05 level of confidence

It is clear from the Table 15 that, the mean difference with respect to sub scapular skin fold measurement of weight training group and yoga group was found to be significantly greater than that of control group. No significant difference between the two experimental groups was found with respect to sub scapular skin fold measurement.

Discussion and findings

Both the experimental groups showed significant increase in performance of all the physiological and health related fitness variables under study, compared to those of control group. But the yoga group showed significantly better gain in performance of subjects in heart rate, systolic blood pressure, diastolic blood pressure (all physiological variables under study), one mile run and tricep skin fold measurement than the weight training group.

The results of the study coincided with the general conception that yogic exercises improve cardio-vascular endurance and weight training helps improve agility, muscular strength and endurance of the players in a progressive manner.

References

1. Bera TK, Rajapurkar MV. "Body composition, cardiovascular endurance and anaerobic power of yogic practitioner". Indian Journal of Physiology and Pharmacology 1993; 37(3):225-228.
2. Capen, Edward K. "The Effect of Systematic Weight Training on Power, Strength and Endurance", Research Quarterly 1950; 21:83-93.
3. Gharote ML. Effect of yogic training on physical fitness. Yoga-mimamsa 1974; 15(1):31-35.
4. Wilkins, Bruce M. "The Effect of Weight Training on Speed of Movement", Research Quarterly 1952; 23:361-369.