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Effects Of Various Gymnastic Exercises on Selected Motor Fitness Components of School Students

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Abstract

Purpose: The study was to clarify the influence of six-week various gymnastic exercises on selected motor fitness components of school going students. **Materials and Methods:** Thirty boys students (age = 14 to 16 years) were randomly assigned to the experimental group (n=30) and control group (n=30). All student was selected from The Jain International School, Bilaspur, Chhattisgarh. Various gymnastic exercises were included in the experimental group training session 6 times (each session 60 minutes) per week over 6 weeks as part of their usual weekly training regime. Both groups of gymnasts were tested selected motor fitness components before and after training. Motor fitness components performance were tested and measured through standard procedure with the help of expert and under the direct supervision of the experimenter. For the analysis of data statistical mean, standard deviation and 'T'-test was used. The level of significance was set at 0.05 ($p \leq 0.05$). **Conclusion:** In conclusion, there was a significant effect of various gymnastic exercises on selected motor fitness components of experimental group.

Keyword: Gymnastic exercise, motor fitness, muscular strength, agility, cardio-vascular endurance.

1. Introduction

Modern gymnastics welcomes creative quest and self-expression. It reveals that the human body possesses practically limitless opportunities and is also a means of moral education and importantly, gymnastics has a great appeal for the young. Gymnastics is an activity involving performance of exercises requiring strength, flexibility, agility, coordination, balance and grace. Internationally, all of the gymnastics sports. Gymnastics is divided into several different and distinct forms and these are all gaining in popularity. The types of gymnastics are A. Modern Artistic gymnastics. Modern Rhythmic gymnastics. Trampoline and Tumbling. Floor Gymnastic exercise [4]. There has been a clear tendency toward younger gymnasts executing increasingly challenging exercises in artistic gymnastics, one of the most well-liked and quickly expanding sports for young females [5]. Muscular strength in boys increases fairly linearly with chronological age, from early childhood until approximately 13 or 14 years of age (mid-puberty). In girls, strength improves linearly up until about 15 years of age, but there is no clear

evidence of an adolescent spurt [9]. compared the isokinetic muscle performance of the scapular muscles in elite adolescent gymnasts and non-athletic adolescents to find out if there were any differences in strength, endurance, and muscle balance based on high-level sport participation. It was discovered that elite gymnasts showed higher values for the protraction peak force/body mass [3]. The effects of a 6-week combined electro myo stimulation (EMS) and gymnastics training program on muscle strength and vertical jump performance in 16 prepubescent gymnasts and found that improvement was found after three weeks of EMS training in the maximal voluntary torque (MVT) [7]. Isokinetic training of knee extensors and flexor muscles increases functional correlation between speed and strength leading to improved performance of acrobatic elements in floor exercises[13].Effect of plyometric training when added to habitual gymnastic training on handspring vault performance variables on twenty youth female competitive gymnasts and found significant improvements for run-up velocity, take-off velocity, hurdle to board distance, board contact time, table contact time and post-flight time. However, there were no significant improvements on pre-flight time, shoulder angle or hip angle on the vault for the plyometric training group [11].The 10-week isokinetic training that was added to the traditional training improved the knee strength, which consequently improved aspects of the vault, but did not affect other technical aspects of the handspring performance[6].The findings of this study show that older persons who were living independently experienced significant gains in gait performance, muscle power, and ETGUG following a typical training regimen. However, after performing foot gymnastics exercises, there is no further impact on physical performance. [10].Water gymnastics helps improve the aerobic exercise capacity, to superior indices compared to the activity on the ground, being directly influenced by materials used through the size of water surface contact and complexity of movements[1].High-intensity circuit training using sport-specific exercises, increased HR to levels above 80% and 90% HR_{max} for extended time periods, and thus may be considered as an appropriate stimulus, in terms of intensity, for improving aerobic fitness in child female gymnasts [12].

1.1 Objective of the study

To find-out effect of various gymnastic exercise on motor fitness components of secondary school students.

1.2 Hypothesis

H0-There would be no significance change of various gymnastic Exercises on Selected motor fitness components of school students.

2. Methodology

Selection of the subject, Sampling technique, Selection of the variable, Design of the study, Training Schedule, Collection of data.

2.1 Population and Sampling technique

For this study the subjects was selected from The Jain International School, Bilaspur, Chhattisgarh, India. Total of sixty (60) subjects was randomly selected out of which thirty (30) were experimental group and other thirty (30) were control group. The age of the subjects was ranged between 14-16 years.

2.2 Selection of variables & Criterion measuring tools

For the present study the researcher used to measure the following motor fitness variables through the AAHPER test.

A) Muscular Strength: To measure the muscular strength (Arm and Shoulder) Pull-ups (for boys) used from AAHPER test and it was measured in number.

B) Agility: To measure the agility Shuttle run used from AAHPER test and it was measured in second.

C) Cardio-vascular Endurance: To measure the cardio-vascular endurance six hundred yard run-walk from AAHPER test and it was measure in minute and second.

2.3 Administration of the test:

After the selection of this subject from The Jain International School, Bilaspur, Chhattisgarh, the researcher administered motor fitness tests to measure the motor fitness components before and after the gymnastic exercise training program of six weeks. The motor fitness components were tested and measure through AAHPER & Bass Stick Test with the help of expert and under the direct supervision of the experimenter. Research scholar administrated the following tests given below.

i) Pull-ups (for boys)

Purpose: To measure the arm and shoulder strength.

Equipment: A wooden or metal bar approximately 1.5’ in diameter a piece of pipe or the runs of a ladder may also be used and stopwatch (only for girls).

Procedure: The height of the bar should be such that when the subject hangs from it with fully extended arms, his feet do not touch the ground. The subject is asked to use an overhand grasp with the palms facing away from the body. From the hanging position, the pupil raises the body by the arms until the chin can be placed over the bar and then lowers the body to a full extension hang and repeats the pull ups as many times as possible. Only one trial is given unless it is obvious that the pupil has not had a fair chance. Neither swinging, nor kicking the legs nor knee-raising is allowed.

Scoring: - The maximum number of completed pull ups is the score which may be evaluated with the help of local norms (if available) or by comparison with other subjects tested.

ii) Shuttle Run:

Purpose: To measure the speed and agility.

Equipment: Two blocks of wood (2”x2”x4”), a stopwatch and marking power. The subject should wear spikes or run bare foot.

Procedure: Two parallel lines are marked on the floor 10 yards apart or the width of the regular volleyball court may be used for the test. The two wooden blocks are placed behind one of the lines. The subject is asked to start from behind the other line. On the signal ready? Go, the time starts the watch and the subject runs towards the blocks, picks-up one block, runs back to the starting line, places the block behind the starting line, runs back and picks-up the second block to be carried back across the starting line. As soon as the second block is placed on the ground the timer stops the watch and records the time.

Scoring: Two trials are allowed to each subject with some rest in between. The time of the better of the two trials is recorded to the nearest 10^{th} of a second as the score of the test item.

iii) Six hundred Run-Walk:

Purpose: To measure the cardio-vascular endurance.

Equipment: Track or marked area and stopwatch.

Procedure: The subject is asked to take a standing start. At the signal Ready? Go!, the subject starts running the 600 yard distance. The test is usually performed on 10-12 subjects together by pairing off before the start of the event. Walking is permitted but the performer is to cover the distance in the shortest period of time.

Scoring: - The time taken to run 600 yards recorded in minutes and seconds is the score of this test item.

2.4 Design of the study

For the present study sixty (60) male subjects were selected randomly from The Jain International School, Bilaspur, Chhattisgarh, India.Their age ranged from 14-16 years. The subject divided into two equal groups of 30 (thirty) subjects in each. One is treated as experimental (practice gymnastic exercise) group, the second one is control (without practice) group. The experimental group will practice gymnastics exercise, for six (6) days a week for 1hours (60) minutes each day, for the period of six weeks under direct supervision of the experimenter. The control group did not practice any special training during the period of six weeks.

2.5 Training Schedule

Table-1: Six weeks Training Schedule

Sr. No.	Gymnastic-Exercises	Week (1-2)	Week (3-4)	Week (5-6)
1	Forward roll, jump with half turn (180 degree)	4 repetitions 2 set	6 repetitions 3 set	8 repetitions 4 set
2	Backward roll and jump with half turn (180 degree)	4 repetitions 2 set	6 repetitions 3 set	8 repetitions 4 set
3	Handstand	4 repetitions 2 set	6 repetitions 3 set	8 repetitions 4 set
4	Cartwheel	4 repetitions 2 set	6 repetitions 3 set	8 repetitions 4 set
5	Leg Split	5 repetitions 2 set	7 repetitions 3 set	9 repetitions 4 set
6	Leaps and jumps	4 repetitions 2 set	6 repetitions 3 set	8 repetitions 4 set
7	Illusion turn	4 repetitions 2 set	6 repetitions 3 set	8 repetitions 4 set

Note: Relaxation 10-15 seconds after each exercise

2.6 Collection of the Data:

To find out the Effects of gymnastic exercises on selected motor fitness components of school students, the data were collected through the administration of "AAHPER test" before and after the gymnastic exercises program of six weeks. To see any significant deferent 'T' test was used for farther statistical analysis.

3. Results

All the data pertaining to the present study were examined by employing 't' test to find out whether any significance difference between the means of motor fitness component of school students. The following notations were used for all the subsequent tables for elaborations.

E.G.- Experimental group, C.G.- Control group, N- Number of subjects in group, M- Mean score of the group, S.D.- Standard deviation of 't' – 't' value, 'P'- P value.

Table-2: Mean, Standard Deviation, Men difference, and 't' ratio of the pre and post test of experimental and control groups on muscular strength (Pull-ups in numbers)

Sl.no.	Group	Test	N	M	SD	MD	't' value	P- value
1	E.G	Pre test	30	5.33	0.95	0.06	0.13	.448508
2	C.G	Pre test	30	5.27	1.57			
1	E.G	Post test	30	7.6	1.35	2.2	4.33	.00003
2	C.G	Post test	30	5.4	1.43			

Level of Significance was at .05 (2,58) =2.00

Table- 2 reveals that the pre test mean of experimental and control groups muscular strength are 5.33 and 5.27 and their calculated 't' value is 0.13 which is lesser than of tabulated value 2.00 at 0.05(58) level of confidence. There is no significance difference found between the experimental and control groups of pre test on muscular strength. Whereas the mean of post test experimental and control groups are 7.6 and 5.4 and their calculated 't' value is 4.33 which is greater than that of the tabulated value 2.00 at 0.05 level of confidence. It was indicated that there is significance difference between the experimental and control groups of post test on muscular strength. It can be said that six weeks gymnastic exercises training effect on muscular strength of muscular group. Hence, the null hypothesis is rejected.

Figure-1: Graphical presentation of mean difference between the experimental and control groups on muscular strength

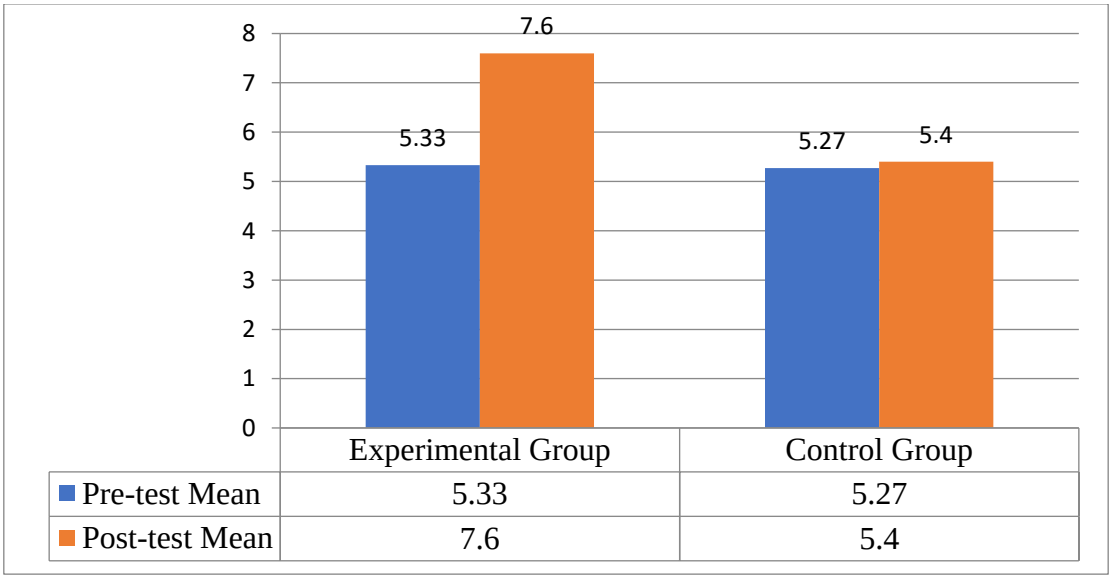


Table-3: Mean, Standard Deviation, Men difference, and 't' ratio of the pre and post test of experimental and control groups on agility (shuttle run in seconds)

Sl.no.	Group	Test	N	M	SD	MD	't' value	P- value
1	E.G	Pre test	30	7.16	0.68	0.04	0.14	.444573
2	C.G	Pre test	30	7.20	0.84			
1	E.G	Post test	30	6.13	0.05	1.03	4.62	.000011
2	C.G	Post test	30	7.16	0.78			

Level of Significance was at .05 (2,58) =2.00

Table-3 show that the pre test mean of experimental and control groups on muscular power are 7.16 and 7.20 and their calculated 't' value is 0.14 which is lesser than that of tabulated value 2.00 at 0.05(58) level of confidence. There is no significance difference found between the experimental and control groups of pre test on agility. Whereas the mean of post test experimental and control groups are 6.13 and 7.16 and their calculated 't' value is 4.62 which is greater than that of tabulated value 2.00 at 0.05(58) level of confidence. It was indicated that there is significance difference between the experimental and control groups of post test on agility. It can be said that six weeks gymnastic exercises training effect on agility of experimental groups. Hence, the null hypothesis is rejected.

Figure-2: Graphical presentation of mean difference between the experimental and control groups on agility

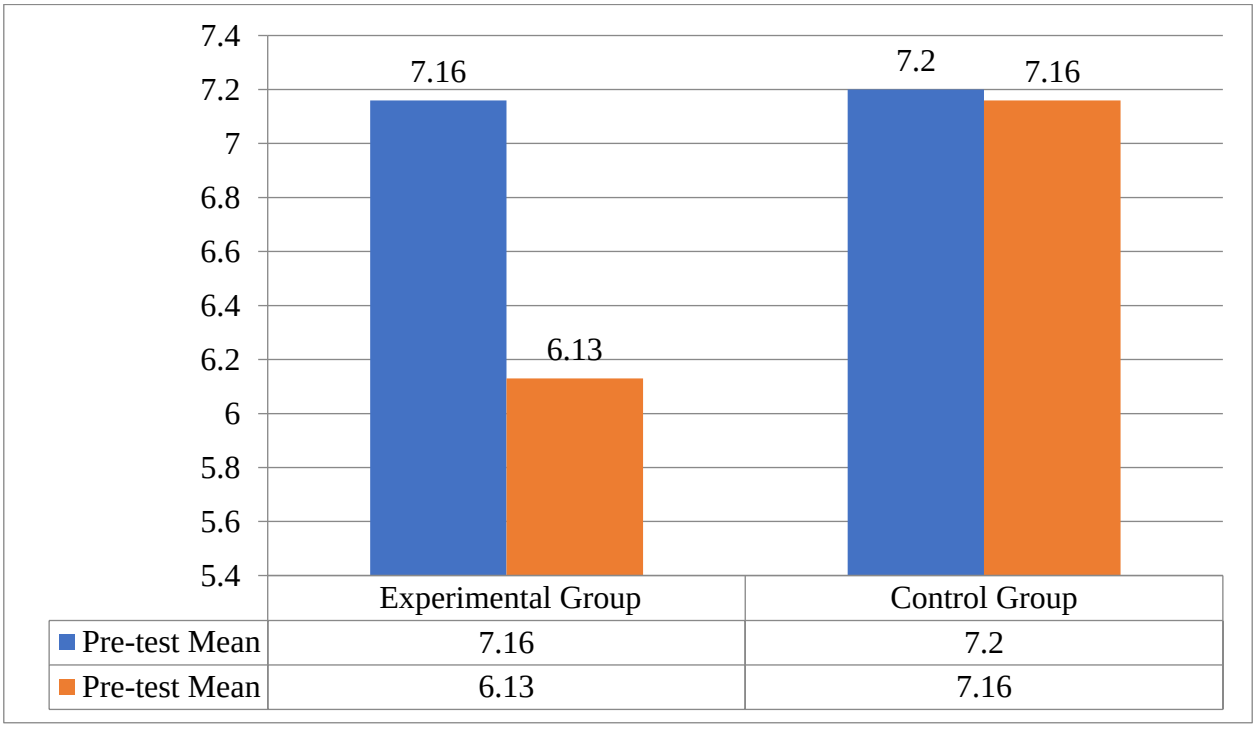


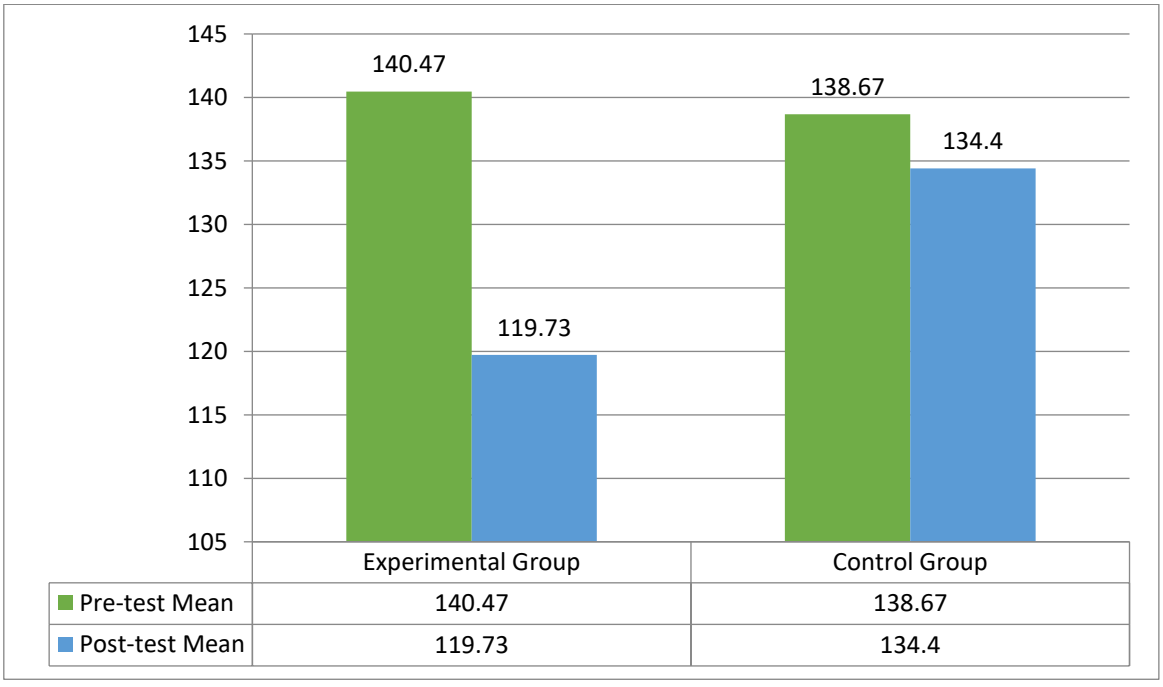
Table-4: Mean, Standard Deviation, Men difference, and 't' ratio of the pre and post test of experimental and control groups on cardio vascular endurance (six hundred run-walk in minutes & seconds)

Sl.no.	Group	Test	N	M	SD	MD	't' value	P- value
1	E.G	Pre test	30	140.47	6.57	1.8	0.82	.207787
2	C.G	Pre test	30	138.67	5.24			
1	E.G	Post test	30	119.73	9.22	14.67	3.15	.001291
2	C.G	Post test	30	134.40	7.94			

Level of Significance was at .05 (2,58) =2.00

Table-4 show that the pre-test mean of experimental and control groups on cardio-vascular endurance are 140.47 and 138.67 and their calculated 't' value is 0.82 which is lesser than that of tabulated value 2.00 at 0.05(58) level of confidence. There is no significance difference found between the experimental and control groups of pre test on cardio-vascular endurance. Whereas the mean of post test experimental and control groups are 119.73 and 134.4 and their calculated 't' value is 3.15 which is greater than that of tabulated value 2.00 at 0.05(58) level of confidence. It was indicated that there is significance difference between the experimental and control groups of post test on cardio-vascular endurance. It can be said that six weeks gymnastic exercises training effect on cardio-vascular endurance of experimental groups. Hence, the null hypothesis is rejected.

Fig-3: Graphical presentation of mean between the experimental and control groups on cardio-vascular endurance



4. Discussion of the Findings

On the basis of the results and findings it was concluded that there are significance differences in motor fitness variable between the experimental and control groups. It was found that experimental group is highly muscular strength, agility and cardio-vascular endurance then that of control group. It may be attributed to the fact that six weeks gymnastic exercises training may be improve the muscular strength, agility, cardio-vascular endurance of experimental group.

5.Testing of Hypothesis

According to the hypothesis of the study, the observed result was confirming that there was significant difference of various gymnastic Exercises on Selected motor fitness components of students, so, as per the assessment of significance, the null hypothesis was rejected.

6.Conclusion

Six weeks various gymnastic exercises training significantly improved on selected motor fitness components of school students. The muscular strength, agility and cardio-vascular endurance of the students in experimental group has improved significantly in comparison with the control group due to the effect of six weeks gymnastic exercise training.

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