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## The effect of selected yoga asanas on physical fitness of school children

**Dr. Kumara Swamy, Sanjeev S Patil**

### Abstract

Yoga is an ancient health – art developed & perfected over the centuries by the sages & wise men of ancient India – Yoga is not a religion, a metaphysical doctrine or a philosophy. It can make amazing improvement in our health, appearance and Youthfulness. Yoga has many benefits in comparison to many others exercises. It is an exercise that can be done by any age group & even by the most unfit people. Yoga is also the most comprehensive of all exercises as it benefits each part of the body. The purpose of the present study was to investigate the effects of selected yoga asanas on physical fitness of school children.

**Keywords:** The Following Yoga asanas Selected For the Study.

Urdhava – Dhanur –asana, Upavista – Kona – asana, Paschima – Uthana – asana, Ardha – Matsyendra – asana, Nava – asana, Tola – asana, Utkata – asana, Prasarita – Pada – Uttana – asana, Nata Raja – asana.

### Introduction

Yoga is an ancient health – art developed & perfected over the centuries by the sages & wise men of ancient India – Yoga is not a religion, a metaphysical doctrine or a philosophy. It can make amazing improvement in our health, appearance and Youthfulness. Yoga has many benefits in comparison to many others exercises. It is an exercise that can be done by any age group & even by the most unfit people. Yoga is also the most comprehensive of all exercises as it benefits each part of the body.

Physical fitness can be characterized by a high level and relatively constant functional state of organ systems arising from effect of regular training and it is a basic pre-requisites for human motor actions.

In the present study yoga is mainly associated with the physical fitness. Physical fitness is the key to success in General life, partially during educational life as well as in sports. This can be achieved excellently by following the yogic routine.

The present study has been conducted with the aim that Yogic asanas & pranayamas have positive effect on physical fitness components.

### Statement of the Problem.

- The purpose of the present study was to investigate the effects of selected yoga asanas on physical fitness of school children.

### Significance of the Problem

- The study helps to find out the effect of selected yoga asanas on physical fitness components.
- The study is helpful to improve the physical fitness of participants.
- The study will enhance the knowledge & experience of researcher.

It helps to academicians & physical educationalists to introduce yoga in the schools to achieve the benefits derived from it.

### Hypothesis

- It was hypothesized that selected yoga asanas will significantly improve on the physical

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### Limitations

- The food, nutrition & the body types of the students were not taken into account.
- Age was recorded as found in the school admission register secondary school.
- The subject belonged to non-residential secondary school.

### Delimitation's

- The study has been on 60 students belong to the secondary school.
- The study is confined to secondary school children of the age group (15-16) years.
- Only selected yoga asanas were practiced for the duration of 10 weeks.
- Only untrained students were selected.
- Students belonged to rural areas only.

### Definition and Meaning of Terms

**Yoga asanas:** The word yoga is derived from the Sanskrit root yuj meaning to bind, join, attach & yoke, to direct & concentrate one's attention on, to use & apply. It also means union or communion<sup>1</sup>.

Yoga is Indian Unique contribution to the world.

Pathanjali Maharishi <sup>2</sup> defines asanas as "Sitha sukhan Asanam" meaning stables and comfortable phase.

Pathanjali Maharishi Has Stated In His "Pathanjali Yoga Sutra As Yoga Citta Vrithi Nirodha" It is otherwise known as the process of equilibrium of mind <sup>3</sup>

### Physical Fitness

#### Flexibility

Flexibility can be defined as the ability to execute movements with greater amplitude or range <sup>4</sup>

#### Strength

"According to HARDAYAL SINGH strength is one of the conditional abilities which is primarily dependent upon the energy liberation process of the organism. It is the ability of an individual to overcome resistance or to act against which is needed in all kinds of work & physical activity"

"Muscular strength is generally defined as the maximum amount of force that a particular muscle groups can exert against a resistance."<sup>5</sup>

#### Endurance

Endurance is a very important ability in sports. Endurance is the product of all psychic & physical organs & systems. No other motor ability depends so much on the working capacity of complete psycho – physical apparatus of human as endurance.

Endurance is primarily determined by energy liberation processes. The ability of the human body of endurance. <sup>6, 7</sup> according to Dr. Hardayal Singh "Endurance is the ability to do sports movements, with the desired quality & speed under conditions of fatigue,"

<sup>1</sup> B.K.S. Iyengar, Light On Yoga, Yoga Dipika (London: George Allen And Unwin Published In 1991)

Pg. 19 Harper Collins Publishers.

<sup>2</sup> Pathanjali Yoga Sutra, Ghorakhpur: Gita Press, 1952,3. Ibid'

<sup>3</sup> Hardayal Singh: "Science Of Sports Training" (Dvs Publications) Jan 1984

<sup>4</sup> Larry .G.Shaver, essentials of exercise physiology [Delhi; subject publications 1982] p-25

<sup>5</sup> Hardayal Singh: " General Theory Method of Training" (DVS Publications, New Delhi)

<sup>6</sup> Ibid

<sup>7</sup> Harre D : Training slehre. Sportver lag, Berlin 1986.

Harre <sup>8</sup> defines endurance as the resistance ability to fatigue.

#### Speed

Speed is a basic conditional ability to move travel quickly & execute movement in the appropriate time. Level of speed can be expressed by the duration of activity or the ration of space & time.<sup>9</sup>

#### Agility

Agility is an ability. According to zimmermann (1983) Hirtz (1985) & meinel & Schnabel (1987). <sup>10</sup> "Co -ordinative abilities are understood as relatively stabilized & generalized patterns of motor control & regulation processes."

Since one & half decade the term agility has been gradually replaced by the term co-ordinative abilities.

<sup>11</sup>zaciorkij (1971), Hirtz (1973) Mattaush (1973) expers. Explained agility to be composed of a different number of coordinative abilities.

## II. Review of Related Literature

Dhanaraj <sup>12</sup> found that after only six weeks of daily practice of the Yoga routine, there was an increase in a measure of flexibility. The group, which practiced five weeks program for physical fitness also increased flexibility, although a lesser magnitude than that of the yoga group.

The difference between pre training and post – training scores was statistically high significant (P.005) for both groups, or was the difference between the improvements in flexibility of the two groups. The post- detraining decreases in flexibility for the yoga group was statistically significant.

Moses <sup>13</sup> "Conducted a study on effect of Yoga on flexibility and respiratory measures of vital capacity and breath holding time" Considered changes in flexibility (Extension flexion ranges). Statistical Analysis of the measurement showed significant increase in flexibility for hip, hip and trunk and neck although not for ankle.

Derives <sup>14</sup> Found in one of his studies the significant improvement in flexibility by administering both static and ballistic type of exercise.

Flishman <sup>15</sup> This is the most vital and largest part of physical fitness. Strength creates the base for the other elements of physical fitness to improve. The ancient concept of physical fitness was identical with strength is a measure of monitoring high level of physical fitness comprises broad functions.

Anderson <sup>16</sup> Regular activites of stretching reduce muscle tension & help the body feel more relaxed improve co-ordination by allowing for free and easier movement. Increase range of motion, prevent injuries such as muscle strains. Develops body awareness and promote circulation. Flecshman also states that a person who could perform yoga would scope

<sup>8</sup> Hardayal Singh : "General Theory Method of Training" (DVS Publication, New Delhi) P P 84.

<sup>9</sup> Zimmermannk Zur Weiterentwicklung der Theorie der Koordinativen Fähigkeiten. In. wissen, zeit. Der DHFK, Leipzig 1984 33

<sup>10</sup> Zarsiorskij V.M. : Die, Körperlichen, Eigenschflen des Sportlers – in. Theories and praxis der Körperkothur, Beiheft 2.20.1971

<sup>11</sup> Danaraj V.H. (1975 Yoga & Physical Fitness Collected papers on yoga, Kaivalyadhama.

<sup>12</sup> Robson Moses "Effects of Yoga on Flexibility and Respiratory Measures of Vital Capacity and Breath holding time" D.Ed. Dissertation University of Oregon, 1972

<sup>13</sup> Herbert a devise evaluation of static stretching procedures for improvement flexibility, research quarterly and 32:2:329, May 1963.

<sup>14</sup> Edwin A. Fleishman: The Structure and measurement of physical fitness

<sup>15</sup> BOB ANDERSON : The runner ( September 1980)

<sup>16</sup> Edwin a Fleschman, The Structure and measurement of physical fitness (England cliffs, n.j.: prentice hall, inc. 1967) pg.31

extremely high on strength <sup>17</sup> Iyengar <sup>18</sup> states by practicing Asana one can achieve agility, balance endurance movement & general vitality. According to Swami Chidananda practice of yoga creates harmony in the physical, vital, mental & psychological and spiritual of human personality.

**III. Methodology**

In this chapter, selection of the subjects, the test procedure equipment used, procedure of collection of data, place of testing is depicted.

**The Samples:** in the present study single group design procedure was followed. A group of 60 students were selected from government High school. These students went through selected Yogic Exercises for 10 weeks. Daily 1 ½ hours training was given in the strict supervision of the researcher. Before the start of training all the 60 students were pre – tested on physical components. After due training students were again tested like the pre – test.

**The Variables:** The physical fitness variables selected for the present study were flexibility, strength, speed, endurance & agility. The tests, which measure the said components, are given below

Components	Tests
Flexibility	1) Hamstring flexibility Test. 2) Hip mobility Test. 3) Shoulder trunk & Hip flexibility test.
Strength	1) Vertical Jump Test. 2) Press – up Test. 60 sec 3) Sit – UPS Test. 60 sec
Endurance	1) 1. 1/2 Mile Run Test
Speed	2) 40 – Yards dash.
Agility	3) 4 X 10 mts shuttle Run.

**Description of Tools**

Measuring tape, Flexo meter, Stop watch, Caliper and protractor, Measuring scale

**Test Procedures**

**Flexibility**

**Hamstring Flexibility Test**

**Aim:** - To measure the lower – back & Hamstring flexibility.

**Equipment:** Flexo measurer or scale.

**Procedure**

Stand on a bench or step with your legs straight. Reach forward by downward to touch your toes. Measure the distance above or below the bench that subject reach's. A plus sign in front of the measurement means that subjects Fingertips have extended below the bench.

A minus sign means that subject have reached to a point above the bench.

**Scoring:** Find the best distance with 3 or 2 trials. Measure in centimetres & refer to the chart for a fitness rating.

**Hip Mobility Test**

**Aim:** To measure the Hip mobility or flexibility of Hip.

**Equipments:** Caliper (divider) & Protractor.

**Procedure:** Sit on the floor & open your legs as wide as

possible place the callipers tight in to the crotch, so they run along the inside of the thighs. Adjust them to the correct angle, then remove and read off the angle with a protractor.

**Scoring:** The best 2 trials is measured score same as hamstring test.

**Shoulder, Trunk & Hip Flexibility Test**

**Aim:** To measure the flexibility of shoulder, Trunk and Hip.

**Equipment:** Measuring Scale.

**Procedure:**

Draw a line on the floor at right angles to and extended vertically up, a wall, stand with both feet just touching the line with the left side nearest the wall stretch out the right arm & twist around, so the hand touches the wall. Measure the distance reached before or beyond the line. Before the line measurements are prefixed with a minus sign, & beyond the line with a plus sign. The feet do not turn with the shoulders & trunk. Measure left side mobility by standing with subject's right side nearest the wall.

**Scoring:** The best of two trials are is measured – score as with the other mobility test.

**Strength**

**Sit – Ups Test**

**Aim:** To measure the Abdominal strength

**Equipment:** Stop watch and a Gymnastics mat.

**Procedure**

- 1) Have the subject assume the starting position by lying on his or her back with knees at 90. Feet together.
- 2) Another person holds the subject's ankles with hand. Subject's fingers are interlocked behind the neck.
- 3) On the "GO" command the subject begins raising the upper body to the UP Position.
- 4) The subject lowers the body until the upper portion of the back touches the mat. The head, hands, arms, & elbows do not have to touch the ground.
- 5) Count only correct Repetition.
- 6) If the subject fail to reach the UP position, fails to keep the fingers interlocked behind the neck or fails to keep 900 angle the the repetition will not be counted.

**Scoring**

Record the number of correct repetitions achieved in 1 minute.

**Push – Ups Test**

**Aim:** to measure the shoulder strength.

**Equipment:** Stop watch.

**Procedure**

- 1) On the "Get Set" command the subject assumes the front leaning rest position by placing the hands where they are comfortable. The feet may be together or little apart.
- 2) On the "GO" command the subject begins the push-up by bending the elbows and lowering the entire body as a unit until the upper arms are parallel to the ground.
- 3) The subject returns to the starting position by raising the entire body until the arms are fully extended.
- 4) If the subject fails to keep the body straight or lower the entire body until upper arms are parallel to the ground results in disqualification.

**Scoring**

- 1) Record the no. of repetitions correctly completed in 1 Min

<sup>17</sup> B.K.S IYENGAR, Light on Yoga, Yoga Dipika (London :George Allen and Unwin published in 1991) Pg. 42 Harper Collins Publishers.

<sup>18</sup> SWAMI KUALAY ANANDA, some practice of increasing statue of Yoga Mimamsa (Loanwala, Kavalyananda ) 2:2:146 April 1926.

- 2) In correct movements will not be scored.

### Vertical Jump Test

**Aim:** To measure the strength of legs.

**Equipment:** Yard stick ladder wall with a high ceiling and good landing area, chalk, or use a vertical – jump measurement scale.

### Procedure

- 1) The subject puts chalk on the fingertips of the right hand.
- 2) Subject stands with his or her right side to the wall making sure the feet and hips are next to the wall.
- 3) Subject reaches as high as possible with feet flat and make a chalk mark on the wall.
- 4) Subject positions him self or her self comfortably, hand still a high as possible without moving the feet, the athlete flexes the knees, jumps, and places a second chalk mark as high on the wall as possible.

### Scoring

- 1) Measure the distance between the two chalk marks.
- 2) Record the best of three trials.

### Endurance

#### 1 ½ Mile Run

**Aim:** To measure endurance.

#### Equipments & Facilities

Stop watch, 400 – meter track

### Procedure:

The student must run one and a half miles on grass or 6 laps of a 400 – meter track without break. Time the run.

### Speed

#### 40-Yard Sprint.

**Aim:** To measure the speed.

**Equipment:** Stop watch flat surface of 60 Yard

### Procedure

- 1) Ensure that the subject perform adequate stretching & warm – up.
- 2) Allow 2 practice run at sub maximal speed for specific warm – up.
- 3) Have the subject position him self or her self behind the starting line with one or two hands on the line.
- 4) On the “GO” command the subjects sprints the 40 yard distance and decelerates over the remaining 20 yard.
- 5) Timer should start the watch on the signal and stop the watch as the subject crosses the 40 – yard line.

### Scoring

Record two trials, average to the nearest 0.1 and record as the criterion score.

### Agility

#### Shuttle Run Test (4x10mts.)

**Aim:** To measure the agility.

**Equipments:** Stop watch, flat surface of 12 mts., two cones, measuring tape.

### Procedure

- 1) Mark two lines 10 mtrs. Apart on the floor.
- 2) The students stand with his front foot just touching the line & when ready he reaches for the other line. He puts one foot over the far lines, turns, then sprints back to the start line.

- 3) Start timing as soon as his back foot breaks contact with the ground to make the first stride and stop the clock as the recrosses the start.

### Scoring

Record two trials, average to the nearest 0.1 and record as the criterion score.

### The Following Yoga asanas Selected For The Study.

- 1) Urdhava – Dhanur –asana.
- 2) Upavista – Kona – asana.
- 3) Paschima – Uthana – asana.
- 4) Ardha – Matsyendra – asana.
- 5) Nava - asana.
- 6) Tola – asana.
- 7) Utkata – asana.
- 8) Prasarita – Pada – Uttana – asana.
- 9) Nata Raja – asana.

### 1) Pranayama.

**Note:** Surya Namskar was given as warming up activity before starting the asana.

### 1. Urdhava – Dhanur –asana.

Urdhava means upward or raised and dhanur means bow.

- a) Lie on your back. Bend your knees. Bring your heels to your hips. Keep your feet about eight inches apart and parallel to each other.
- b) Place your palms under your shoulders. The fingers must point towards your feet.
- c) Raise your back and buttocks off the floor, curve your spine and rest the crown of your head on the floor.
- d) Straighten your arms. Then walk towards your hands and arch your spine further.
- e) Then bend your elbows and come down gently.

### Do

- Bend your body like bow.

### Don't

- Don't bend your elbows.
- Don't widen your knees too much.

### 2) Upavista – Kona- asana.

Upavistha means seated kona means on angle.

- a) Sit in Danda-asana.
- b) Widen your legs side ways. One leg at a time. Tighten the muscles of your legs and keep your toes pointing upwards. Sit erect.
- c) Hook your big toes with you index and middle fingers bend forward. Rest your forehead or chin on the floor.
- d) Then slowly return to Danda asana.

### Do

- Spread your legs as wide as you can.

### Don't

- Don't bend your knees.

### 3) Pachima – Uttana-asana.

Pachima means the west and Uttana means intense stretch.

- a) Sit in Danda asana. Raise your arms over head. Lengthen your trunk.
- b) Bend forward hold your feet with both hands. Rest your forehead or chin on your knees.

- c) Then slowly return to Danda asana.

**Do**

- Stretch your back.
- Join your big toes and broaden the soles of your feet.

**Don't**

- Don't bend your knees.

**4) Ardha – Mastyendra – asana.**

Ardha Means half. Matsya means fish. In this asana spin is given the maximum lateral twist ardha matsyand nasana is a milder version of Matsyendrasana.

- a) Sit in Danda – asana.
- b) Bend your right leg in. sit on your right foot.
- c) Bend your left knee upwards. Take your left foot across your right knee.
- d) Rotate your waist to your left. Fix your right upper arm against your left outer knee. Ret your left fingertips on the floor.
- e) Curl your right arm around your left shin. Then swing your left arm behind your back and clasp your right hand.
- f) Turn your head and look over your left shoulder.
- g) Then gently come back to Danda – asana.

**Do**

- Lift up your stomach as you turn.

**Don't**

- Don't leave a gap between your bent knee and your armpit.

**5) Nava – asana.**

Navasana means boat

- a) Sit in Danda- asana.
- b) Lean back and raise your legs till they are higher than your head.
- c) Extend your arms out in front of you.
- d) Keep your palms facing each other.

**Do**

- Keep your legs as stiff as planks.
- Keep your arms as stiff as oars.

**Don't**

- Don't be like sinking boat.

**6) Tola – asana.**

Tola means a pair of scales. This pose resembles one pan of a scales.

- a) Sit in a Padma – asana
- b) Place the palms on the floor besides your hips, fingers pointing forward. Raise your crossed legs off the floor and balance.
- c) Then rest on the floor and come back to padmasana.

**Do**

- Distribute your weight evenly on both palms.

**Don't**

- Don't look down.

**7) Utkata – asana**

Utkata means high. This asana is like sitting on an imaginary chair.

- a) Stand in Tada – asana
- b) Stretch your arms upwards. Join your palms. Bend your knees. Look straight ahead.
- c) Then return to Tada – asana

**Do**

- Imagine you are sitting on a chair

**Don't**

- Don't lean forward.

**8) Prasaritha – Pada – Uttana-asana.**

Prasarita means spread, extended pada means a foot. Uttana means intense. The pose is one where the expanded legs are stretched intensely.

- a) Stand in Tada – asana.
- b) Jump and spread your legs 3 to 4 feet apart stand on a line toes pointing forward.
- c) Place your palms on the floor fingers pointing forward, lookup.
- d) Reset the Crown of your head on the floor.
- e) Then raise your head up. Jump back to Tada – asana.

**Do**

- Keep your feet palms and head all in one line.

**Don't**

- Don't bend your knees.
- Don't turn your toes out.

**9) Natarajasana.**

Nataraj (nata=dance, Raja=lord, King) is the name of shiva.

- a) Stand in Tadasana. Stretch the left arm out in front keeping it parallel to the floor.
- b) Bend the right knee and lift up the foot. Hold the right big toe between the thumb and the index and middle fingers of the right hand. Bend the lifted right knee and draw the leg up and back.
- c) Roll the fingers and thumb of the right hand round the right big toe. Simultaneously rotate the right elbow and shoulder and stretch the right arm up behind the head without releasing the grip on the big toe. Again pull the right arm and leg up so that they form a bow behind the bank.
- d) Bring the left arm straight in front level with the shoulder keeping the fingers pointing forward.
- e) Release the grip on the right foot lower both arms and stand again in Tada – asana.

**Do**

- The right thigh will be parallel to the floor and the right shin perpendicular to it.

**Don't**

- Don't lean forward.

**1) Pranayama.**

The word pranayama is derived from two Sanskrit root called prana and ayama. Pran means breath and ayam means its control or regulation. It involves breath control exercise through which one should be able to suspend breath in or out as long as possible, without strain or much difficulty. Pranayam basically involves following four steps:

- a) Inhalation of breath.
- b) Suspension of breath inside.

- c) Exhalation or breathing out.
- d) Suspension of breath outside.

**DO**

Be in padmasana posture.

- Always inhale and exhale through the nose.
- While breathing in, the belly should go inwards and it should go outward while breathing out.
- Breath should be slow, full and deep.

**Don't**

- Don't breath through the mouth may be harmful.
- Don't breath short, incomplete and quickly.

**Surya Namaskara**

Suryan namaksar is a unique exercise. Surya means sun and Namaskar means salutation. It combines Asanas and pranayama. This prepares to perform further physical activates in yoga.

- a) It consists of 11 postures.
- b) One posture smoothly and gracefully flows into the next posture with proper breathing.

**Technique of Statistical analysis**

For the purpose of the study, the mean, standard deviation and 'Z' ratio are estimated by using the following formula.

$$\text{Mean} = \frac{\sum fx}{N}$$

$$\text{Standard Deviation} = \frac{\sqrt{\sum fD^2}}{N}$$

Further to investigare the significance difference between means in dependent.

"Z" test was carried

$$\text{"Z" ratio} = \frac{X_1 - X_2}{\sqrt{\frac{S.D^2}{N_1} + \frac{S.D^2}{N_2}}}$$

**IV. Analysis and Interpretation of Data**

As the purpose of the study was to compare "the effects of selected yoga asanas on physical fitness of school children" the obtained data was calculated as per the norms using such as mean, standard deviation and 'Z' ratio for the obtained pre and post-tests which are discussed below.

**Flexibility:** - (Hamstring flexibility Test Hip mobility Test, Shoulder Trunk and hip flexibility Test)

**Strength:** - (Vertical Jump Test, Press – ups test, Sit-ups Test)

**Endurance:** - 1 ½ Miles Run Test Speed: - 40 Yards dash Test.

**Agility:** - 4X10 mts. Shuttle Run Test.

**Flexibility**

**Table 1:** showing the pre-test and post-test value of the students in "Hamstring Flexibility Test" (H.F.T)

Variable	Mean		S.D		Z. Ratio
	Pre	Post	Pre	Post	
H.F.T	62.77	68.05	10.67	10.09	-2.79

**The Z-ratio value significant at 0.01 level – 2.33**

Table No.1 shows the mean, standard deviation and 'Z' ratio of "Hamstring Flexibility Test". According to the table the pre-test mean is 62.77 and post-test mean is 68.05. The standard deviation of pre-test 10.67 and post-test 0.9 was found, the 'Z' value was -2.79 which is significant.

**Hip Mobility Test**

**Table 2:** Showing The Pre-Test And Post-Test Value Of The Students In Hip Mobility Test (H.M.T)

Variable	Mean		S.D		Z. Ratio
	Pre	Post	Pre	Post	
H.M.T	65.73	68.72	8.99	9.53	-1.77

**The Z-ratio value significant at 0.05 level – 1.645**

Table No.2 shows the mean, standard deviation and 'Z' ratio of "Hip Mobility Test". According to the table the pre-test mean is 65.73 and post-test mean is 68.72 the standard deviation of pre-test 8.99 and post-test 9.53 was found, the 'Z' value was -1.77 which is significant.

**Shoulder Trunk & Hip Flexibility Test**

**Table 3:** showing the pre-test and post-test value of the students in Shoulder Trunk & Hip Flexibility Test (S.T.H.F.T)

Variable	Mean		S.D		Z.Ratio
	Pre	Post	Pre	Post	
S.T.H.F.T	68.37	72.23	7.84	6.39	-2.94

**The Z-ratio value significant at 0.01 level – 2.33**

Table No. 3 shows the mean, standard deviation and 'Z' ratio of "in Shoulder Trunk & Hip Flexibility Test". According to the table the pre-test mean is 68.37 and post-test mean is 72.23 the standard deviation of pre-test 7.84 and post-test 6.39 was found, the 'Z' value was -2.94 which is significant.

**Strength**

**"Vertical Jump Test"**

**Table 4:** showing the pre-test and post-test value of the students in "Vertical Jump Test"(V.J.T)

Variable	Mean		S.D		Z.Ratio
	Pre	Post	Pre	Post	
V.J.T	27.5	33.55	6.67	6.77	-4.93

**The Z-ratio value significant at 0.01 level – 2.33**

Table No. 4 shows the mean, standard deviation and 'Z' ratio of "Vertical Jump Test". According to the table the pre-test mean is 27.5 and post-test mean is 33.55 the standard deviation of pre-test 6.67 and post-test 6.77 was found, the 'Z' value was -4.93 which is significant.

**Push – Up Test**

**Table 5:** showing the pre-test and post-test value of the students in "PUSH – UP TEST" (P.U.T)

Variable	Mean		S.D		Z. Ratio
	Pre	Post	Pre	Post	
P.U.T	34.03	40.3	12.02	10.12	-3.11

**The Z-ratio value significant at 0.01 level – 2.33**

Table No. 5 shows the mean, standard deviation and 'Z' ratio of "Push – Up Test". According to the table the pre-test mean

is 34.03 and post-test mean is 40.3 the standard deviation of pre-test 12.02 and post-test 10.12 was found, the 'Z' value was -3.11 which is significant.

**Sit – Up Test**

**Table 6:** showing the pre-test and post-test value of the students in "Sit – Up Test" (S.U.T)

Variable	Mean		S.D		Z. Ratio
	Pre	Post	Pre	Post	
S.U.T	38.7	43.03	13.4	10.36	-1.96

**The Z-ratio value significant at 0.05 level – 1.645**

Table No. 6 shows the mean, standard deviation and 'Z' ratio of "Sit – Up Test". According to the table the pre-test mean is 38.07 and post-test mean is 43.03 the standard deviation of pre-test 13.4 and post-test 10.36 was found, the 'Z' value was -1.96 which is significant.

**Endurance  
"1 ½ Mile Test"**

**Table 7:** showing the pre-test and post-test value of the students in "1 ½ Mile Test" (ENDU)

Variable	Mean		S.D		Z. Ratio
	Pre	Post	Pre	Post	
ENDU	18.7	22.43	10.84	11.44	-1.83

**The Z-ratio value significant at 0.05 level – 1.645**

Table No. 7 shows the mean, standard deviation and 'Z' ratio of "One and Half Mile Test". According to the table the pre-test mean is 18.7 and post-test mean is 22.43 the standard deviation of pre-test 10.84 and post-test 11.44 was found, the 'Z' value was -1.83 which is significant.

**Speed  
40 Yards Dash Test**

**Table 8:** showing the pre-test and post-test value of the students in "40 Yards Dash Test (S.T)

Variable	Mean		S.D		Z.Ratio
	Pre	Post	Pre	Post	
S.T	4.73	4.43	92.63	79.65	0.02

**The Z-ratio value significant at 0.05 level – 1.645**

Table No. 8 shows the mean, standard deviation and 'Z' ratio of "40 Yards Dash Test". According to the table the pre-test mean is 4.73 and post-test mean is 4.43 the standard deviation of pre-test 92.63 and post-test 79.65 was found, the 'Z' value was -0.02 which is significant.

**Agility  
Shuttle Run Test**

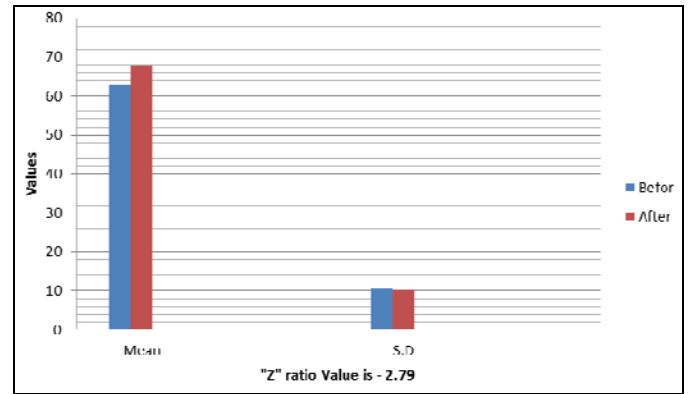
**Table 9:** showing the pre-test and post-test value of the students in "4X10 Mtr. Shuttle Run Test" (S.R.T)

Variable	Mean		S.D		Z.Ratio
	Pre	Post	Pre	Post	
S.R.T	10.9	17.83	12.75	13.75	-2.86

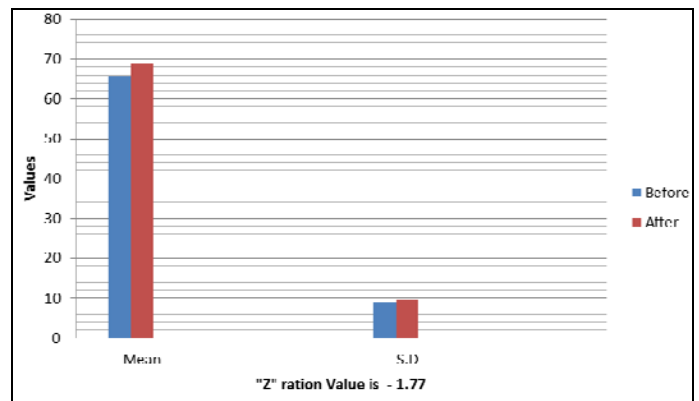
**The Z-ratio value significant at 0.01 level – 2.33**

Table No. 9 shows the mean, standard deviation and 'Z' ratio of "4X10 Mtr. Shuttle Run Test". According to the table the pre-test mean is 10.9 and post-test mean is 17.83 the standard

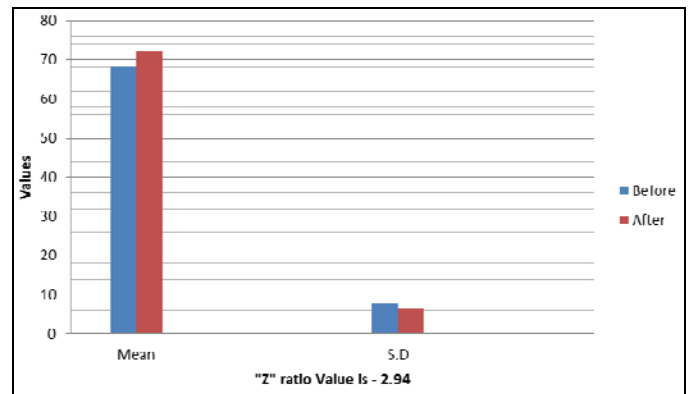
deviation of pre-test 12.75 and post-test 13.75 was found, the 'Z' value was -2.86 which is significant.



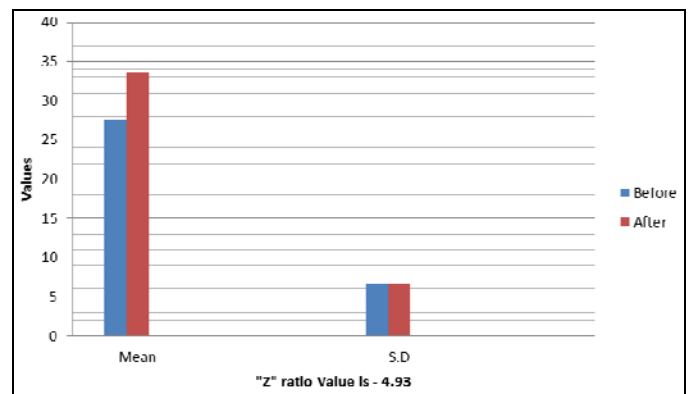
**Bar Graph 1:** showing the Mean and S.D. of Hamstring Flexibility Test



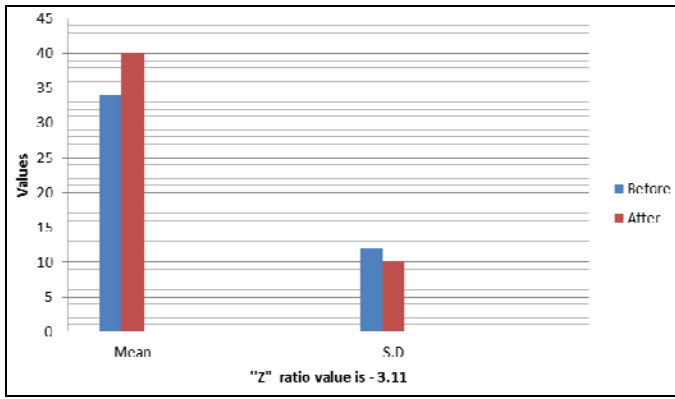
**Bar Graph 2:** Showing the Mean and S.D of Hip Mobility Test



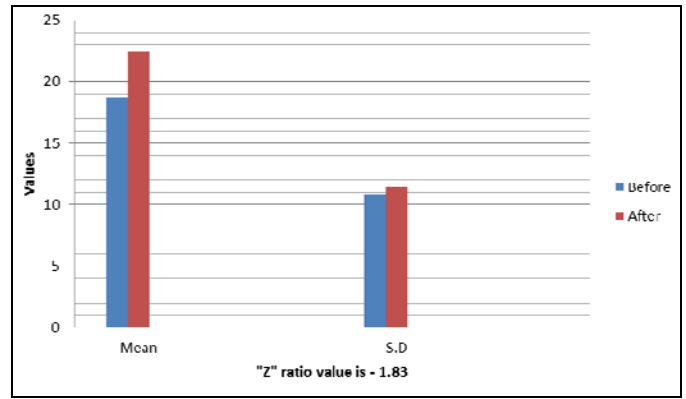
**Bar Graph 3:** Showing the Mean and S.D. of Shoulder Trunk & Hip Flexibility Test



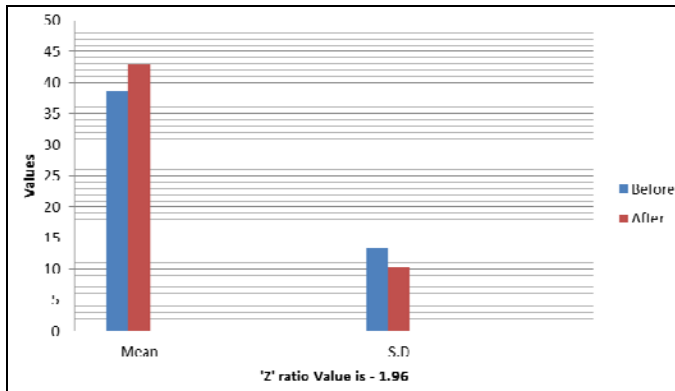
**Bar Graph 4:** Showing the Mean and S.D of Vertical Jump Test



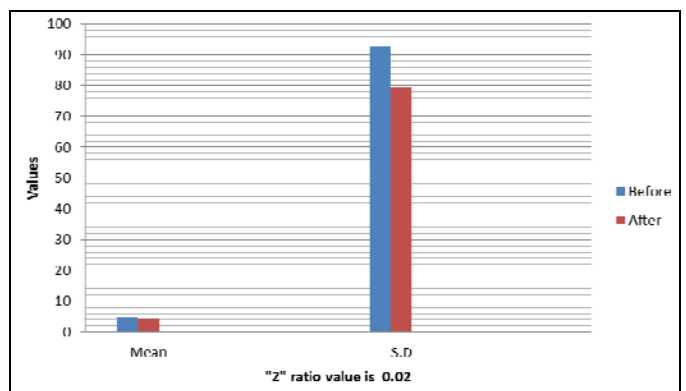
Bar Graph 5: Showing the Mean and S.D of Push Up Test



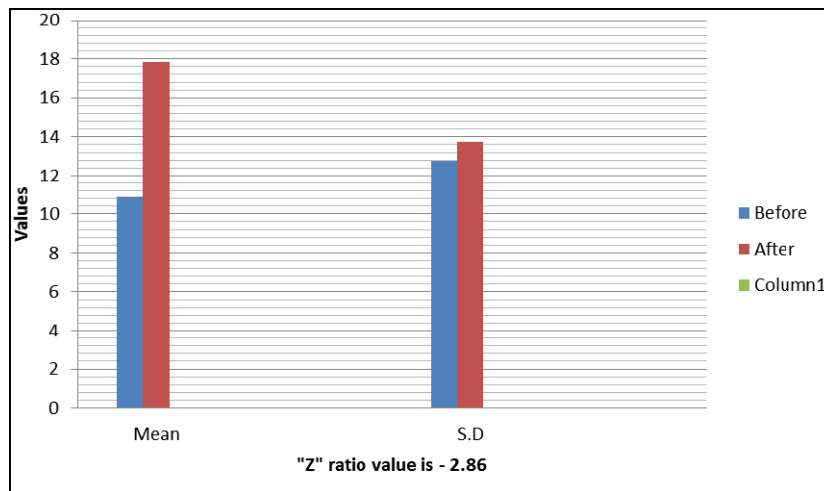
Bar Graph 7: Showing the Mean and S.D of Endurance Test



Bar Graph 6: Showing the Mean and S.D of Sit Up Test



Bar Graph 8: Showing the Mean and S.D of Speed Test



Bar Graph 9: Showing the Mean and S.D of Speed Test

Appendix Pre Test Scores

Sl.No	Name	Height	V.J.T	S.U.T	P.U.T	H.F.T	H.M.T	T.R.T	S.R.T	S.T	Endu
1	Shivana Gowda	157	35	54	45	68	60	62	31	00	26
2	S.K. Abukalam	161	41	52	46	82	57	75	14	00	29
3	K.Nagabhushan	140	27	59	56	54	67	60	35	00	27
4	H.Manjappa	142	29	26	40	58	67	70	27	00	26
5	S.Shashikumar	152	30	45	24	52	70	67	20	00	20
6	P.Rakesh	153	28	53	06	50	70	72	00	00	34
7	N.Mahesh	153	33	40	30	58	70	71	08	00	14
8	M.Malthesh	146	28	47	42	60	67	55	25	00	16
9	P.Kariveera	139	29	38	38	68	83	74	29	00	36
10	Shivanagowda	151	23	53	48	66	67	59	02	00	29
11	G.Thippesh	143	29	38	38	64	70	71	31	00	18
12	H.Prashanth	138	24	43	40	60	70	65	30	00	12
13	H.M. Siddappa	145	40	44	22	64	67	63	23	00	27
14	R.Siddappa	135	30	52	20	60	70	56	20	00	11



15	L.C.Suryanaik	153	33	43	08	66	87	74	25	00	07
16	T.Siddappa	149	29	20	18	72	83	77	22	20	21
17	T.Shambulinga	134	24	41	45	54	57	57	16	00	17
18	S.Lakshmana	143	31	30	34	56	67	75	20	00	19
19	K.Shivappa	165	43	31	32	54	67	64	00	28	34
20	L.C.Ramesh	151	39	60	50	72	80	59	44	33	27
21	K.Fayaz	140	30	52	18	52	63	76	20	00	21
22	L.P.Swamy	147	29	52	40	52	73	75	27	00	19
23	L.L.Vijay	158	40	16	20	62	80	68	20	23	08
24	P.Siddappa	139	32	50	34	54	67	54	16	00	24
25	N.Girish	142	39	54	34	52	77	67	36	00	19
26	L.H.Ninganaik	139	28	40	14	54	73	82	35	00	23
27	M.P.M Shashi	136	36	47	40	64	80	69	11	28	14
28	H.M.Veeresh	143	26	18	20	62	63	56	01	00	12
29	H.M.Veeresh	145	35	46	30	52	67	82	16	00	09
30	H.Savitha	163	29	51	40	90	63	86	00	20	37
31	P.Veeramma	156	27	40	32	72	70	65	00	00	13
32	H.M.Annakka	136	26	41	40	70	67	70	00	00	21
33	N.Yashoda	146	23	45	38	64	63	70	02	00	14
34	H.M.Basamma	145	23	20	51	64	67	60	01	00	37
35	G.Chandravva	155	25	53	30	86	63	59	03	00	05
36	L.Sumitra Bai	158	25	40	46	54	63	80	00	00	21
37	H.Nirmala	139	24	45	48	54	53	67	00	00	19
38	M.Vidyavathi	152	24	07	34	70	60	68	00	00	29
39	H.Maheshwari	155	27	52	45	70	63	65	00	00	11
40	S.Netrabai	155	23	41	36	50	67	84	00	20	22
41	H.M.Pavitra	146	32	49	49	62	67	72	21	23	24
42	M.Rathnamma	146	19	52	50	56	70	75	00	23	25
43	G.Savithri	150	30	24	28	50	47	73	12	00	41
44	A.Renuka	152	23	30	04	88	70	69	00	00	21
45	N.Suvarna	146	23	10	40	56	60	70	00	00	01
46	Reshma Banu	149	07	38	40	78	67	60	00	00	00
47	H.M.Pallavi	141	27	44	50	68	63	72	03	00	23
48	Swetha C.M	151	24	35	42	54	67	62	10	23	22
49	P.Sudha	144	23	41	34	68	67	61	00	00	09
50	N.Shivaleela	148	28	42	26	64	53	56	00	00	16
51	Jayamma	149	20	43	28	62	77	81	00	00	19
52	S.Sharada	140	17	10	12	76	47	75	00	00	08
53	P.Pushpa	158	19	32	22	72	47	65	00	20	00
54	Neelamma	154	21	24	36	66	60	70	00	00	51
55	N.Majavva	148	20	26	44	90	67	67	00	00	14
56	Bhuvaneshwari	151	18	20	24	70	47	77	00	00	00
57	B.Shruthi	145	31	41	42	46	53	60	00	00	05
58	S.Savita	149	32	52	22	60	47	73	00	00	11
59	Gangamma	141	25	12	41	44	60	60	00	00	00
60	K.Kavitha	144	15	20	36	50	70	75	00	23	04
Total			1650	2324	2042	3766	3944	4102	656	284	1122

## Appendix Post Test Scores

Sl.No	Name	Height	V.J.T	S.U.T	P.U.T	H.F.T	H.M.T	T.R.T	S.R.T	S.T	Endu
1	Shivana Gowda	157	44	56	55	72	66	66	32	00	28
2	S.K. Abukalam	161	44	32	47	84	70	76	30	00	30
3	K.Nagabhushan	140	31	45	47	51	70	63	27	00	29
4	H.Manjappa	142	29	38	42	64	73	76	30	00	28
5	S.Shashikumar	152	31	49	43	64	76	81	37	00	17
6	P.Rakesh	153	32	53	20	56	73	61	37	00	35
7	N.Mahesh	153	34	48	45	62	70	73	31	00	14
8	M.Malthesh	146	30	47	49	60	70	70	28	00	17
9	P.Kariveera	139	30	41	40	70	100	78	30	00	38
10	Shivanagowda	151	31	53	52	70	66	68	32	00	30
11	G.Thippesh	143	30	44	44	70	70	72	34	00	29
12	H.Prashanth	138	41	45	45	62	73	65	28	00	13
13	H.M. Siddappa	145	41	44	41	72	70	65	32	00	28
14	R.Siddappa	135	31	52	20	60	70	74	28	00	17
15	L.C.Suryanaik	153	33	45	26	74	86	78	31	00	08
16	T.Siddappa	149	37	46	40	70	86	84	31	20	23
17	T.Shambulinga	134	41	42	38	56	76	77	20	00	20
18	S.Lakshmana	143	34	40	50	58	60	66	17	00	19
19	K.Shivappa	165	43	40	40	58	70	67	42	20	35

20	L.C.Ramesh	151	45	65	58	78	84	60	40	23	28
21	K.Fayaz	140	32	55	30	54	63	77	19	00	23
22	L.P.Swamy	147	33	52	40	64	76	77	37	00	24
23	L.L.Vijay	158	40	26	20	64	80	69	21	23	10
24	P.Siddappa	139	34	48	20	54	70	70	19	00	25
25	N.Girish	142	39	56	43	64	76	69	40	00	19
26	L.H.Ninganaik	139	31	42	16	68	86	74	31	00	25
27	M.P.M Shashi	136	38	47	42	74	80	70	33	28	15
28	H.M.Veeresh	143	28	32	44	66	66	57	0	00	13
29	H.M.Veeresh	145	36	38	20	54	70	77	18	00	10
30	H.Savitha	163	32	51	42	92	66	87	33	20	37
31	P.Veeramma	156	28	44	44	94	70	70	3	00	21
32	H.M.Annakka	136	26	44	38	74	76	65	0	00	14
33	N.Yashoda	146	32	45	42	86	66	71	24	00	29
34	H.M.Basamma	145	29	47	53	70	70	61	23	00	21
35	G.Chandravva	155	31	55	45	90	66	76	8	00	5
36	L.Sumitra Bai	158	41	43	47	66	66	82	23	00	21
37	H.Nirmala	139	41	38	42	66	63	69	0	00	31
38	M.Vidyavathi	152	30	52	43	70	63	65	0	00	12
39	H.Maheshwari	155	26	45	48	62	56	69	4	00	19
40	S.Netrabai	155	27	41	49	54	70	85	17	20	24
41	H.M.Pavitra	146	34	50	51	64	70	74	22	23	29
42	M.Rathnamma	146	26	54	55	62	73	76	7	23	39
43	G.Savithri	150	30	43	40	66	50	73	19	00	25
44	A.Renuka	152	45	43	34	74	70	70	4	00	22
45	N.Suvarna	146	41	14	41	72	63	71	2	00	3
46	Reshma Banu	149	44	44	41	84	50	63	0	00	37
47	H.M.Pallavi	141	28	44	40	70	66	74	7	00	25
48	Swetha C.M	151	26	47	54	58	66	74	19	23	24
49	P.Sudha	144	41	41	46	78	70	76	0	00	10
50	N.Shivaleela	148	28	52	40	66	56	79	0	00	16
51	Jayamma	149	21	56	40	68	76	83	0	00	19
52	S.Sharada	140	19	10	36	78	50	77	0	00	10
53	P.Pushpa	158	25	36	26	72	50	66	0	20	38
54	Neelamma	154	44	32	40	70	63	72	0	00	54
55	N.Majavva	148	44	28	46	92	70	71	18	00	0
56	Bhuvaneshwari	151	43	24	30	72	60	78	2	00	39
57	B.Shruthi	145	31	45	54	66	56	70	0	00	6
58	S.Savita	149	32	47	16	62	50	74	0	00	12
59	Gangamma	141	26	18	44	52	63	78	0	00	0
60	K.Kavitha	144	19	28	36	60	73	75	0	23	54
Total			2013	2582	2420	4083	4123	4334	1070	266	1346

## V. Conclusions and Recommendations Summary,

The purpose of the study was to investigate “The Effects of Selected Yoga asanas on Physical Fitness of School Children” with the assumption that selected yoga asanas significantly improve variables taken for study. This study is confined to 60 secondary high school boys & girls from Harakanalu Government High School. The researcher has selected yogasanas as follow:

Surya Namaskara for warm-up activity. Urdhava – Dhanur – asana, Upavista – Kona-asana, Paschima-uttana-asana, Ardhamatsyendra asana, nava-asana, Tola-asana, Utkata-asana, Prasarita-pada, Uttana-asana, Nata Raja-asana, Pranayam.

Tests were conducted before the training & later same tests were conducted after the regular 10 weeks of training daily for 1 ½ hour in morning.

The researcher has done the pre-tests and post tests for all the 60 subjects. The tests were as follows:

Flexibility (Hamstring flexibility Test, Hip mobility Test, Shoulder trunk & Hip flexibility test) Strength (vertical Jump Test, Press – up Test. 60 Ec, St-UPS Test – 60 sec Endurance (1. ½ mile Run Test) Speed (40-yards dash) Agility 4 X10 mts. Shuttle run. It was found that there was improvement in the variables selected except speed which was insignificant. May be because of the following reason:

a) May be the duration of the training was not sufficient.

## Flexibility

**Hamstring flexibility Test:** According to the table 1, there was a difference in mean value and also in the standard deviation. The pre-test mean was 62.77 and post-test was 68.05 and the standard deviation was 10.67 and 10.69. There was a significant improvement in the students Hamstring flexibility when it was compare to the pre and post-test. The ‘Z’ value -2.79 is significant at 0.01 level -2.33

**Hip mobility Test:** According to the table 2, there was a difference in mean value and also in the standard deviation, the pre-test mean was 65.73 and post-test was 68.72 and the standard deviation was 8.99 and 9.53 there was a significant improvement in the students Hip Mobility. The ‘Z’ value -1.77 is significant at 0.05 level -1.645.

**Shoulder trunk & Hip flexibility Test:** According to the table 3, there was a difference in mean value and also in the standard deviation, the pre-test mean was 68.37 and post-test was 72.23 and the standard deviation was 7.84 and 6.39 there was a significant improvement in the students shoulder trunk & Hip flexibility. The ‘Z’ value -2.94 is significant at 0.01 level -2.33.

### Strength

**Vertical Jump Test:** According to the table 4, there was a difference in mean value and also in the standard deviation, the pre-test mean was 27.5 and post-test was 33.55 and the standard deviation was 6.67 and 6.77 there was a significant improvement in the students leg strength. The 'Z' value -4.93 is significant at 0.01 level -2.33.

**Press-up Test. 60 sec:** According to the table 5, there was a difference in mean value and also in the standard deviation, the pre-test mean was 34.03 and post-test was 40.3 and the standard deviation was 12.02 and 10.12 there was a significant improvement in the students shoulder strength. The 'Z' value -3.11 is significant at 0.01 level -2.33.

**Sit -UPS Test. 60 sec:** According to the table 6, there was a difference in mean value and also in the standard deviation, the pre-test mean was 38.07 and post-test was 43.03 and the standard deviation was 13.4 and 10.36 there was a significant improvement in the students abdominal strength. The 'Z' value -1.96 is significant at 0.05 level -1.645.

**Endurance (1 ½ mile Run Test):** According to the table 7, there was a difference in mean value and also in the standard deviation, the pre-test mean was 18.7 and post-test was 22.43 and the standard deviation was 10.84 and 11.44 there was a significant improvement in the students abdominal strength. The 'Z' value -1.83 is significant at 0.05 level -1.645.

**Speed Test (40 –yards dash):** According to the table 8, there was a difference in mean value and also in the standard deviation, the pre-test mean was 4.73 and post-test was 4.43 and the standard deviation was 92.63 and 79.65 there was a insignificant improvement in the students speed. The 'Z' value -0.02 is insignificant at 0.05 level -1.645.

**Agility 4X10 mts. (Shuttle run):** According to the table 9, there was a difference in mean value and also in the standard deviation, the pre-test mean was 10.9 and post-test was 17.83 and the standard deviation was 12.75 and 13.75 there was a significant improvement in the students agility. The 'Z' value -2.86 is significant at 0.01 level -2.33.

### Conclusion

Taking into consideration the limitation & de-limitations of this study, the investigator came to the following conclusions based on the results obtained in this research.

The selected yogasana helped the subjects in developing the said variables except speed.

### Recommendations

On the basis of the results of this study the following recommendation were drawn.

- a) The study may be conducted on different age group for a period of 10 weeks daily 1 ½ hour to know the influence of the Yogic practice on different physical, physiological and psychological variables.
- b) The yoga asanas should be made compulsory for the boys and the girls at the school level.
- c) The yogic practice should be made available to all the students to enhance their physical fitness.
- d) The yoga training should be provided to all the teachers also to popularize the yogic practice at school level.

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