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## Effects of Yogasanas on Physiological and Psychological Variables of High School Girls

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### CHAPTER – I INTRODUCTION

**“Health is wealth, Peace of Mind is Happiness and “Yoga” Shows the way”**

**By: Swami Vivekananda**

Play is natural to a child as leaves are to the tree; Play involves activity-both physical and mental. Play activities change like the motor mechanism which is so important for the acquisition of skills “not only for sports but also for life.” Over the decades, it has been realized that play activities should be given a respectable place in the school curricula especially at the primary, elementary and basic levels of formal education. Unfortunately, despite this, adequate facilities for play in school and in neighborhood are hardly available. Children are the budding flowers of the society, and they are the future of any nations. Their proper nurturing is has a bearing on their holistic development of personality. The social, psychological, and perhaps physical development has something to do with their achievements in future. Thereby, they can emerge as responsible citizens of the nation. Nations development depends on its youthful productive human resource. Healthy youth fullness is within all-round development of the children. (Jagdishchandra Savalia, 2017).

When you are fit, you look better and feel better and likely to have more physical and mental energy, when you feel fit, the good things of life have more meaning: “the sky is blue, the steak tastier”. It is to be noted that sports and yoga play the vital role in ensuring sound health of the children. “Today’s children are tomorrow’s citizens”. Hence it is the duty of everybody concerned to see that our future citizens are strong, healthy and have a perfect personality. Children have to be active every day. Physical activity stimulates growth and leads to improved physical, mental and emotional health. Medical researchers have observed that highly active children are less likely to suffer from high blood pressure, diabetics, obesity and coronary heart diseases later in life. It is well established fact that participation in physical education and sports activities is highly beneficial to one’s health and leads to improved performance by students in schools, in addition to helping them in developing many life skills.

Despite these recognized benefits, it remains a concern that within schools “the increasing pressures to improve academic scores often lead to additional instructional time for subjects such as mathematics and language at the cost of time for being physically active” (Singh 2012). In agreement, Trudeau and Shepard (2008) stated that if we want to improve the academic achievement, physical fitness and health of our young people, we should not be limiting the time allocated to Physical Education and school sport. These days’ children face a lot of pressure and stress due to competition and they need to excel in studies. It is important to encourage children to play, eat, study and get adequate rest for balanced growth; we should build a habit of regular exercise in our children. There is a need for structured age appropriated physical activity for better cognitive, emotional and mental development. However, due to the limited research available on these competition specific outcomes, the findings presented focus on the role physical activity, Physical Education and school sport play on the holistic development of the child. Particular attention has been paid to the academic, diet and health and wellbeing outcomes for young people.

## Present status of “Yoga” in Physical Education and Sports in India

In Present day yoga is respected around the world and accepted as a life style practice. Researcher's carried art it the Past have proved beyond doubt that yoga has improved not only the physical body but also the mind. Yoga is the art and science of maintaining physical and mental wellbeing that has its origin in India, is among the most ancient yet vibrant living traditions that is getting increasingly popular today. A potent stress buster, yoga is an instrument of self-evolvement and enlightens, through physical and mental well-being. Multi dimension it enhances the quality of our lives at so many levels. One aspect of yoga's benefits is to explore the bond between health and beauty. Yoga makes children strong; yoga is an art, science and philosophy. It provides techniques to promote health at physical, mental, emotional and intellectual levels. Yoga is considered as a form of Mind and body medicine. A popular saying in Kannada ‘**Yogi - Nirogi**’ which means a person who practices yoga is free from diseases.

*The word Yoga derived from Sanskrit word ‘YUJ’ meaning to yoke, Join or to unite.*

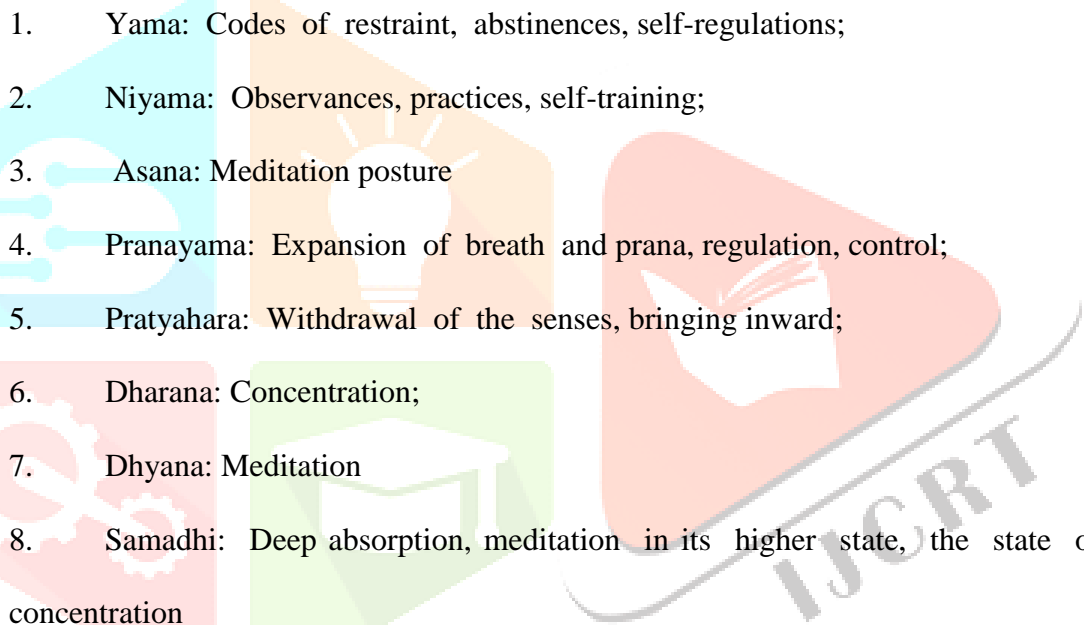
This implies joining or integrating all aspects of the individual body with mind with soul- to achieve a happy, balanced and useful life, and spiritually, uniting the individual with the supreme. However, the origins of yoga are believed to be much older than that, stemming from the oral traditions of yogis, where knowledge of yoga was handed down from Guru (spiritual teacher) to Sisya (spiritual student) all the way back to the originators of yoga, the ‘Rishis’, who first began investigation into the nature of reality and man's inner world.

Yoga is a form of relaxation and exercise that incorporates stretching, meditation and the knowledge of the body's full potential. It helps in relieving tension and stress, and helps to increase the strength and vitality. In ancient Indian medicinal system, yoga is described as the link between the individual and the universe (Parmatma). It can play an important role in our life by controlling the function of our mind i.e. ego, desire and intellect. Yoga is a well-known physical, mental and spiritual practice since the ancient time and still benefitting people globally. The growing popularity of yoga and its increasing socialization attracted many workers for scientific enquiry in the science of yoga. It is interesting to known that in the past few decades, the interest of yoga has increased tremendously, Although, modern science has failed

to prevent such kind of ailments but yoga practice has potential to provide relief from anxiety and tension.

Yoga as a way of life is more true to its ancient tenets. It constitutes asanas, regulated breathing (pranayama), and awareness of yoga sutras (principles) that govern the mind. Regular practice of yoga enhances awareness of mind and body, which is needed in the self-management of diet and exercise plan in diabetes. According to Patanjali, yoga consists of eight steps or limbs, which are all equally important and are related as parts of a whole. The purpose of these eight limbs is discriminative enlightenment or self-realization.

But here the emphasis will be on health benefits. The eight steps or limbs of yoga are as follows:

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1. Yama: Codes of restraint, abstinences, self-regulations;
  2. Niyama: Observances, practices, self-training;
  3. Asana: Meditation posture
  4. Pranayama: Expansion of breath and prana, regulation, control;
  5. Pratyahara: Withdrawal of the senses, bringing inward;
  6. Dharana: Concentration;
  7. Dhyana: Meditation
  8. Samadhi: Deep absorption, meditation in its higher state, the state of perfected concentration

### Benefits of Yogasana –Physiological

**Flexibility:** Stretching tight body in new ways will help it to become more flexible, bringing greater range of motion to muscles and joints. Over time, one can expect to gain flexibility in hamstrings, back, shoulders and hips.

**Strength:** Many yoga poses require us to support the weight of our own body in new ways, including balancing on one leg (such as in tree pose) or supporting with our arms. Some exercises require us to move slowly in and out of poses, which also increases strength.

**Muscle tone:** As a byproduct of getting stronger, one can expect to see increased muscle tone. Yoga Pain Prevention: Increased flexibility and strength can help prevent the causes of some types of back pain. Many people who suffer from back pain spend a lot of time sitting at a computer or driving a car. That can cause tightness and spinal compression, which one can begin to address with yoga. Yoga also improves alignment, which helps prevent many other types of pain.

**Better Breathing:** Most of us breathe very shallowly into the lungs and don't give much thought to how we breathe. Yoga breathing exercises, called Pranayama, focus the attention on the breath and teach us how to better use of our lungs, which benefits the entire body. Certain types of breath can help clear the nasal passages and even calm the central nervous system, which has both physical and mental benefits.

### **Mental Benefits: Psychological**

**Mental Calmness:** Yogasana practice is intensely physical. Concentrating so intently on what the body is doing has the effect of bringing calmness to the mind. Yoga also introduces one to meditation techniques, such as watching how one breathes and disengagement from thoughts, which help calm the mind.

**Stress Reduction:** Physical activity is good for relieving stress, and this is particularly true of yoga. Because of the concentration required, daily troubles, both large and small, seem to melt away during the time of doing yoga. This provides a much-needed break from stressors, as well as helping put things into perspective. The emphasis yoga places on being in the moment can help relieve stress, as we learn not to dwell on past events or anticipate the future. One will leave a yoga class feeling less stressed than when started helps shape long, lean muscles.

**Body Awareness:** Doing yoga will give an increased awareness of our body. One is often called upon to make small, subtle movements to improve alignment. Over time, this will increase the level of comfort in our body. This can lead to improved posture and greater self-confidence.

Yogic exercise develops the muscular fitness, endurance, strength and flexibility etc. Yogasana can cure and help in preventing various diseases. Yogic practices help in regulating the breathing mechanism and increasing vital capacity.

## Benefits of Yogasana – Physical

Yoga is an excellent method of enhancing the performance of sports participants. Silent feature of yoga is the combination of both physical conditioning and focused concentration. Physical fitness can be attained excellently by indulging in yogic routine. Yogic exercises deal with the vital organs of the body on which health depends. The precursor for physical fitness lies in the efficient working of the vital organs of the body and yoga aims at it. The various selected asanas giving different movements to the spine, controlled respiration, relaxation technique and concentration practice as a whole form an excellent routine to take care of the health of vital organs of the body. Although not many scientific researchers have been done, the works of Oaken and Johnson (2000) have shown enough evidence about how yoga could be gainfully employed in the promotion of physical factors.

## Other Benefits of Yoga

Yoga for a good many people begins with the poses and postures at the body level, thanks to which health and beauty of the body and its vitality can be enhanced and preserved. Yoga is the extraordinary uniquely Indian technique helping man to develop a deep awareness of him - of every vibration and pulsation within – at the body, mind and intellect levels, by virtue of which he can master the forces internal and external. Yoga bestows inner strength, sharpens our intellect, teaches us to control our emotions and brings a rare concentration and efficiency in to our actions and work, making one do the things right way at the right and that's is why Yoga is often described as skill in action.

## Yogic practice

Yogic practice can increase our lung capacity and respiration, improves our ability to resist stress, reduce body weight and girth, decrease cholesterol and blood sugar level and stabilize, restore and vitalize the body's natural system.

## Yogasana

Asanas are one of the major tools of Yoga. Their benefits range from the physical level to the spiritual. Asanas is the positioning of the body in various postures with the total involvement of the mind and self, in order to establish communication between our external and internal selves (**swami Vivekananda**).

### Current Status of “Yoga” and Research

In view of the role of yoga in the wellness of humans, the UN General Assembly on 11 December 2014 declared 21 June as the International Yoga Day which was first celebrated in the year 2015 by 192 countries, the biggest ever event. Usually, yoga is used in the form of asana, pranayama or short periods of meditation for therapeutic purposes. A number of research practices are under progress in India to discover the role of yoga in physical and mental health. Ministry of “**Ayush**”, Government of India is supporting research on various fields of yoga science. Recently, department of science and technology (DST) also launched a scheme called science and technology of yoga and meditation (SATYAM) to promote the yoga research.

Indian Prime Minister Narendra Modi stated in his speech during UN General Assembly that yoga is not just about fitness or exercise, it is about changing one's lifestyle, and emphasized to plugging for ancient practice that was introduced to the west by Swami Vivekananda. Recently, he insisted that yoga is our ancient medical therapy and it should be mandatory in the syllabus of all schools/colleges. In this connection, the University Grants Commission (UGC) has planned to induct yoga into the curriculum of public-funded universities, hoping to cash in on Prime Minister's push for the ancient discipline and its growing popularity across the world. As per **Brajesh Kumar's report**, the apex regulatory body for higher education has prepared a proposal to introduce BSc and MSc in Yoga in all 40 central universities from the 2016–17 academic session and, later, in state and deemed universities. It is imperative that Indian universities engage themselves in strengthening scientific evidence of the positive effects of yoga and meditation on human health. In order to pursue education and practice in yoga, it is proposed to establish centers and departments of yoga in the public-funded universities.



## Relationship of “Yoga” with Sports Psychology

Yoga has both preventive and therapeutic benefits. It has been proved beneficial for both physical and mental fitness. The many physical benefits of yoga are, it improves flexibility by losing the joint mobility, it builds muscles strength, spine, and corrects bad posture. Yoga will increase stamina of a player and creates balance and also stimulates the glands of the endocrine system, improves digestion and elimination, improves circulation and heart condition. All this is very helpful to the players to achieve better performance. Anxiety is a mild fear reaction toward some stimulus. It is prevalent in even the best of athletes due to the immense pressures associated with professional sports. Anxiety is a normal response of an organism towards a physical threat or psychological distress, which generates a host of chemical and hormonal reactions in the body. It has two components; physiological and psychological which are mediated by neurotransmitter system.

Perception Many practitioners were drawn towards the theories and espoused by the early perceptual motor development as it greatly enhances the role of physical education. Perception is involved in all voluntary muscular movement, except reflex action. There is very little evidence to indicate a direct relationship between learning specific perceptual motor skills, and learning to read and write. To get information, sensory input like sight, sound, touch, smell, taste as well as awareness of a body position, all these act as the components of perception. For any official movement, all their senses are used in integrated manners in complex motor activity. By regular engaging in a given activity perception can be improved.

## Relationship of “Yoga” with Sports Physiology

Yogasana and Physical activity may play a role in regulating the physiological mechanisms which underlie disease outcomes (Dunn & Blair, 1997). Cross-sectional studies have found differences between physically active and less active groups, especially in relation to blood pressure. Several adult studies have examined immediate changes in physiological parameters following a single session of Yogasana relaxation, and have tended to find the conscious employment of relaxation techniques to be slightly more effective than undirected rest. For instance, a session of guided muscular relaxation has been shown to be more effective in reducing heart rate than control supine rest (Sakakibara, Takeuchi, & Hayano, 1994). Furthermore, heart rate recovery



following exercise has been shown to be faster with individuals practicing guided relaxation compared with control supine or seated rest (Bera et al., 1998). Current knowledge regarding the physiological effects of yoga in adults has also been summarized: stabilization of the autonomic nervous system, improvement of the thermoregulatory system, improved respiratory function, improvement in endocrine system function, and alpha wave activation (Kimura, Ohno, Kumano, & Kimura, 2000). In terms of heart rate, two adult studies suggest that adults are more relaxed immediately following yoga sessions and can also learn self-relaxation by the end of a yoga program. A study by Cusumano and Robinson (1992) indicated that both yoga and progressive relaxation participants' heart rates were lower immediately after yoga sessions compared to before. Most recently, Telles and Vani (2002) explored voluntary heart rate reduction in a group of yoga novices following a one-month yoga program. They found that, using biofeedback apparatus over a six-minute period, participants were able to reduce their heart rates "at will" to a significantly greater degree than matched controls.

### **Effects of Yogasana on Physiological and Psychological Variables**

It is necessary to note that the nature of all yogic practices is psychological and physiological. Some exercises emphasizing the control of mental processes directly are more psychological. Other exercises are more physical or physiological. It is this latter part of yogic practices that has become more popular and is being extensively used for the development and promotion of health and fitness. The yogic exercises in general differ from the physical exercises and the important differences are:

1. The physical exercises are repetitive in character and utilize a lot of energy whereas yogic exercise helps to conserve energy. The caloric requirement of yogic exercises is only 0.9 to 3 calories per minute depending upon the severity of exertion.
2. Relaxation forms the most important aspect of yogic exercise unlike physical exercises, during the practice of asanas; muscles which do not support weight or which are not actively involved are relaxed. With relaxation, the muscles return to normality after contraction and therefore yogic exercises keep the body more flexible. Physical exercises improve the circulation of blood in voluntary system, thereby resulting in better muscular development as

a result of improved function of the muscles. Yogic exercises aims at improving blood circulation to all vital organs thus improve their function.

3. Unlike physical exercises, in yogic exercises spine has been given an important place and various exercises for the spine aim at keeping the spine flexible and joints supple.

4. Yogic exercises influence both mind and body whereas physical exercises have their effect mainly on the body. They have more positive reaction to stress, thus minimizing its ill effects.

### **Yoga for Women**

Women's are said to be the weaker sex. This is truly said in terms of physical strength. In olden days women tended to stay indoors, whereas men used to toil outdoors. Looking after the house, children, used to be their responsibility which are tasks no less as compared to working outside. Thus women in these ancient periods used to stay fine. The same cannot be said to the women of this modern era. A majority of them opt for working outside in order to be independent and earn themselves. Today's lifestyle has proved to be sedentary, not involving any physical work. Working condition are mostly desk jobs that require women to be seated in one place for long hours, thus decreasing movements and increases health problems. Yoga helps women to keep up their health and ward off health problems. In addition to various health issues women have to deal with pain related to menstruation child birth. Yoga gives them the tolerance to bear and increases their pain threshold. It also helps women to gain back their previous body structure after child birth. Modern women are very conscious about their figures and yoga helps them to stay in shape increasing their confidence and gaining personality. Cancer is the world's most prevalent disease that has claimed the lives of numerous women. Women who practice yoga are at least risk to contract cancer compared to women who don't yoga flushes out toxins from our body. Yoga also helps women in post-partum period to overcome depression and post-partum blues. Today's women face a lot of stress and pressure at home as well as at workplace. Yoga helps women overcome such work related stress and enables women to relax through meditation.

## Reason for selecting the Topic

The topic which investigator have selected for the thesis is highly significance once. Because due to high academic pressure in school the girls students are under tremendous pressure psychological and due to that their physical development gets hampered. The subjects for the study are from Jamakhandi Taluka and the students live in village. In order to avoid, the present study would help to reduce those problems, definitely help them to get improved in their health as because yoga is for total living. In this study, the researcher was interested to find out the influence of varied packages of yogic practices on selected Physiological and Psychological variables among High school Girls.

## Reasons for the selection of variables

Physiological variables like Resting Pulse Rate, VO2 Max, BMI and Blood pressure are important to determine the health fitness components of the High school Girls. Psychological variables like stress and self-confidence are essential for their behavioral Health. For the same Health fitness components, Physiological and Psychological variables are considered for the study

## Purpose of the study

The broad purpose of the study was to find out the “Effects of Yogasana on Physiological and Psychological Variables of High School Girls”.

## Statement of the Problem

The purpose of the study was to examine effects of Yogasana on Physiological and Psychological variables of High school Girls, which provide an opportunity to answer some of the question such as:

### To Examine the Effect of Yogasana on the Physiological development

1. To Examine the Effect of Yogasana on the Resting pulse rate development of High school Girls.
2. To Examine the Effect of Yogasana on the Blood Pressure development of High school Girls.
3. To Examine the Effect of Yogasana on the Vo2 max development of High school Girls.

## To Examine the Effect of Yogasana on the Psychological development

1. To Examine the Effect of Yogasana on the Stress development of High school Girls.
2. To Examine the Effect of Yogasana on the Self-Confidence development of High school Girls.

### Hypotheses

Based on the questions posed earlier and the available knowledge in the literature the following hypotheses were proposed to be tested. For convenience, the hypotheses have been grouped under the heading of Physiological and psychological characteristics

#### Hypothesis – On Physiological Variables

##### Hypothesis I

It was hypothesized that the Yogasana Training improved the following Physiological Variables of high School Girls.

**It was hypothesized that the Yogasana training develops Resting pulse rate.**

##### Hypothesis II

**It was hypothesized that the Yogasana training improves the Systolic Blood Pressure level**

##### Hypothesis III

**It was hypothesized that the Yogasana training improves the diastolic Blood Pressure level**

##### Hypothesis IV

**It was hypothesized that the Yogasana training develops Vo2 Max.**

##### Hypothesis V

**It was hypothesized that the Yogasana training Improves overall BMI level.**

### **Hypothesis – On Psychological variables**

It was hypothesized that the Yogasana training improves following Psychological variables of High school Girls

#### **Hypothesis VI**

**It was hypothesized that the Yogasana training reduces the Stress.**

#### **Hypothesis VII**

It was hypothesized that the Yogasana training develops Self-confidence.

#### **Delimitations of the study**

- For the purpose of the study, 140 female subjects in the age group ranging from 13 to 16 years were randomly selected as subjects.
- The duration of the experimental period was Restricted to 16 weeks. The number of sessions per week for the Experimental group was confined to six.
- The selected subjects were randomly chosen from Government High school of Jamakhandi District of Karnataka state. The study is conducting only for Girls.
- Selected Yogasana only applied.
- The level of significance was fixed at 0.05 levels, which was considered to be appropriate.
- The data were collected prior to and immediately after the training period.
- Selected subjects were divided into three equal groups namely, Experimental Group I (N=60), underwent Yogasana training, Experimental Group and Group II( N=60) served as Control group

### Limitations of the study

The following factors are the limitations of the study since the researcher could not have control over them and these are have taken into consideration in the interpretation of the data.

- Methodological variation such as air temperature, atmospheric pressure, and relative influence on the result of the study was recognized as limitation for the study.
- The living condition, life style, diets, personal habits, family heredity, emotional status, motivational factors of the subjects were not taken into consideration for this study.
- The social, economic and cultural background of the subjects was not being taken into consideration.
- The subjects routine work and habitual free play was controlled and their possible influence on this result of the study as noted as limitations.

### Significance of the study

Despite the fact that Yoga is an established art with a long history, it has received little scientific attention in the field of research; numerous researchers are being conducted as to certain, effective and most economical methods of selecting and training of Yoga in order to get the best performance in the field of sports fitness. Beyond practical utility research also generate knowledge to address research problems of a broader perspective.

1. Tests of the first four hypotheses mentioned above will yield insight into Physiological distinctness of selected groups for the investigation
2. A second set of hypotheses will show the Psychological differences among selected groups for the investigation
3. So the findings of this study in relation to the Hypothesis mentioned earlier will provide some useful information about the Physiological and Psychological variables of High school Girls.

4. The Result of this study helps Physical Education teachers, coaches and trainer to make use of Yogasana training to improve the Physiological and Psychological Variables of the subjects.
5. This study through light on the level of Physiological and Psychological Variables of the subjects.
6. This study provided useful and productive suggestions for the enhancement of Physiological and Psychological Variables of the subjects.
7. To help / enable coaches to identify deficiencies and to overcome through compensatory training
8. This study may also help and guide the research scholars to undertake similar studies in different games and sports, so that the best criteria for selection of players may be constructed for better performance.
9. Predictions of Successful performance

### Definition of the terms

#### Yoga

The word yoga is derived from the Sanskrit root "YUJ", meaning to blend, join, attach and yoke, to direct and concentrate one's attention to use and apply. It also means union or communication.

#### Asanas

Asana means holding the body in a particular posture to bring stability to the body and poise to the mind. The practices of asana bring purity in tabular channels firmness to the body and vitality to the body and the mind.

#### Yogasana

"Yoga is a way of life, an integrated system of education for the body, mind, and inner spirit. This art of right living was perfected and practiced in India thousands of years ago but, since Yoga deals with universal truths, its teachings, are as valid today as they were in ancient times. Yoga is a practical aid, not a religion, and its techniques may be practiced by Buddhists, Jews, and Christians, Muslims, Hindus, and atheists alike. Yoga is union with all." (Sivananda Yoga Vedanta Centre, 1996)



## Yogic Practice

“Yogic practice is a system or a method of doing or achieving something is based on logic and rational consideration, it qualifies to be scientific.”

### Paschimottanasana

Paschimottanasana is the Sanskrit word. “Paschima” means your “back” and “Uttana” means “stretching“. It is also known as seated forward bend pose.

### Ustrasana

Ushtrasana pose known as camel pose, In Sanskrit ‘ushtra’ means ‘Camel’. The body looks like the shape of camel so it is called as Ushtrasana.

### Ardha Matsyendrasana

The name comes from the Sanskrit words ardha meaning “half“, matsya meaning “fish“, eendra meaning “king“, and asana meaning “posture” or “seat“.

### Vajrasana

Vajrasana is one of the best yoga poses for beginners as it is a simple 'sitting asana'. The term Vajrasana is a combination of the words Vajra (the Sanskrit word for thunderbolt) and asana (meaning posture).

### Supta Virasana

Meaning of “Supta” is reclined and it is a Sanskrit word and the word “Vira” is derived from the word of Sanskrit. In Sanskrit the meaning of “Vira” is hero or a warrior; and Asana stands for Pose, posture or sit.

### Hastapadasana

Hastapadasana is derived from the words hasta means hands, padah means foot and asana means posture or pose. It is also known as standing forward bend or hands to feet pose.

## Hasta Uttanasana

The name Hasta Uttanasana comes from the language as the word Hasta means Hand, Uttanameans Intense and Asana means Pose.

## Trikonasana

This asana resembles a triangle, and therefore, is named so. The name comes from the Sanskrit words (trikona), meaning triangle, and (asana), and meaning posture.

## Ardha Chakrasana

Ardha Chakrasana (Half wheel poses) is easier to practice than Chakrasana. In our previous article, we have already seen the benefits and steps of full wheel pose (Chakrasana).

## Garudasana

The word “garuda” is derived from a Sanskrit word meaning “eagle” and “asana” meaning “posture” or “seat”. It is generally called as “eagle pose” in English.

## Halasana

The name comes from the Sanskrit words hala meaning “plow” and asana meaning “posture” or “seat”. So it is also named as plow pose.

## Sarvangasana

In Sanskrit, Sarvangasana is the combination of two words (Sarva and anga) when these two words are combined together and form Sarvangasana. (Sarva + anga). In Sanskrit, Sarva means all and anga stands for limbs or body part.

## Chakrasana

The name “Chakrasana” comes from the Sanskrit words “Chakra” which means wheel, and meaning of Asana is “Posture” or “seat”. Chakrasana or the wheel pose is a backward bending yoga asana.

## Naukasana

The name Naukasana comes from the Sanskrit words “Nauka” which means “boat” and meaning of Asana is “Posture” or “seat”. So this asana is called as Naukasana.

## **Dhanurasana**

The name “Dhanurasana” comes from the Sanskrit words Dhanura which means “bow” and Asana means “posture” or “seat”.

## **Bhujangasana**

Bhujangasana comes from the Sanskrit words 'bhujanga' and 'asana'. Bhujanga means cobra and asana means 'posture'. Known as Cobra Pose, it reflects the posture of a cobra when it has its hood raised.

## **Rajakapotasana**

Rajakapotasana (King Pigeon Pose) is the Advanced level of Pigeon pose, In Sanskrit “Raja” means King and the meaning of kapot is Pigeon and Asana means Pose, posture or seat. King pigeon Pose is rehearsed in a situated position.

## **Shalabhasana**

In Sanskrit the word “Shalabh” stands for Locust or grasshopper which is a one type of insect, basically found in grass. While doing Shalabhasana the complete body shape seems like a locust or grasshopper structure thus this posture is additionally known as Locust pose.

## **Makarasana**

The meaning of Makarasana in Sanskrit is “Crocodile”, because this Pose resembles a Crocodile during resting with in the ocean. The crocodile keeps its neck and face above the water. A similar form is seen in this pose. Makarasana is a nice Asana for all spherical stretching of the body.

## **Physiology**

A branch of biology that deals with the functions and activities of life or of living matter (such as organs, tissues, or cells) and of the physical and chemical phenomena involved

## Resting Pulse Rate

The time from the end of one contraction to the end of the next contraction is a complete heart beat or pulse or cardiac cycle. The complete cardiac cycle takes less than one second (about 0.08 sec) in a normal adult at rest and it shortened by exercise. (Eva Lurie Weinerb, 1984)

## Blood Pressure

Blood Pressure is the measurement of pressure of the blood flowing through your blood vessels (called arteries) against the vessel walls. Arterial pressure is most commonly measured via a sphygmomanometer, which historically used the height of a column of mercury to reflect the circulating pressure.

### Systolic Blood Pressure

The blood pressure when the heart is contracting, it is specifically the maximum arterial pressure during contraction of the left ventricle of the heart. The time at which ventricular contraction occurs is called systolic blood pressure.

### Diastolic Blood Pressure

It is the pressure of the blood in the arteries when the heart is filling. It is the lower of two blood pressure measurements.

## Vo2 Max

VO2 max is the maximum capacity of an individual's body to transport and utilize oxygen during incremental exercise, which reflects the physical fitness of the individual.

## Height

The measurement of someone or something from head to foot or from base to top

## Weight

A body's relative mass or the quantity of matter contained by it giving rise to a downward force. The heaviness of a person or thing is called as weight

## Body Mass Index (BMI)

The Index is simply the body mass in KG divided by stature in meter square

## Psychology

The study of mind and behavior in relation to a particular field of knowledge or activity

## Sports Psychology

Sport psychology is a proficiency that uses psychological knowledge and skills to address optimal performance and well-being of athletes, developmental and social aspects of sports participation, and systemic issues associated with sports settings and organization.

## Stress

Stress is the emotional and physical strain caused by our response to pressure from the outside world. Common stress reactions include tension, irritability to concentrate and a variety of physical symptoms that include headache and a fast heartbeat. **(Diane L. Cell (1972)).**

## Self -confidence

It can be defined as the belief or degree of certainly individual possess about his ability to be successful in sports **(Robin. S. Vealy, 1978)**

## Physical

Physical fitness is the ability to carry out daily tasks with vigor and alertness without undue fatigue and ample energy to enjoy leisure time pursuits & meet unforeseen emergencies.

“Physical fitness as the capacity of an individual to perform given physical tasks involving muscular effort Mathews” (1973)

## High School Girls

High school Girls are female students, who are studying in Government High school of Jamakhandi Taluka who are recruited as samples for the present investigation

## Control Group

The female high school girls who attended Yogasana training programme for the purpose of the study as subjects are called as control group

## Uncontrolled / Experimental Group

The female high school girls who did not attend Yogasana training programme for the purpose of the study and only recruited for the collection of data as subjects are called as uncontrolled group

## CHAPTER-II

### REVIEW OF RELATED LITERATURE

As described in earlier, the present investigation seeks an insight into Physiological and Psychological variables of High school Girls. In this chapter, the review of related literature is presented for each of these aspects.

**Telles S, Reddy S.K. and Nagendra H.R. (2000)**, had investigated on “Oxygen Consumption and Respiration Following Two Yoga Relaxation Techniques”. The study was conducted to evaluate a statement in ancient yoga texts that suggests that a combination of both "calming" and "stimulating" measures may be especially helpful in reaching a state of mental equilibrium. Two yoga practices, one combining "calming and stimulating" measures (cyclic meditation) and the other, a "calming" technique (shavasan), were compared. There was a significant decrease in the amount of oxygen consumed and in breath rate and an increase in breath volume after both types of sessions (2-factor ANOVA, paired t test). However, the magnitude of change on all 3 measures was greater after. These results support the idea that a combination of yoga postures interspersed with relaxation reduces arousal more than relaxation alone does.

**Kewal Krishan and Sudhir Kumar Sharma (2009)**, carried out an investigation on “Effects of Yogic Practices and Callisthenic Exercises on Resting Pulse Rate Variable of Secondary School Boys”. The objective of this research was to study the effects of yogic practices and callisthenic exercises on resting pulse rate variables of secondary school boys in Hamirpur district of Uttar Pradesh. Total 120 boys subjects (40 yogic practices group, 40 calisthenics exercises group and 40 control group) were put under yogic practices and calisthenics exercises group. A pre-test was taken for all the 120 subjects. Six weeks training of yogic practices and calisthenics exercises was given to the respective groups. A post-test was taken after six weeks of the training. Analysis of variance was applied to compare the four groups, for their heart rate response pattern, and Scheffe's post hoc test was applied to find out the superiority of the group. The result of the study indicated that Resting pulse rate of yogic practices group was better than the other two groups. Keyword: callisthenic & resting pulse rate.

**Ramesh V, Sakthignanavel D and Subramaniam P.K. (2010)**, carried out a study which was an attempt to test the effect of Yogasana and pranayama on the selected physiological variables of school boy's. The selected variables include systolic pressure, diastolic pressure, pulse rate and respiratory rate. To achieve this purpose of the study, thirty boys in the age group of 12 to 15 years were selected from Jawaharlal Navodaya Vidyalaya Higher Secondary School. The subjects were randomly selected and divided equally into two groups as control group and experimental group. The experimental groups were given Yogasana and pranayama training for a period of twelve weeks, both mornings and evenings on five days a week. The control group did not participate in Yogasana and pranayama training programme. The collected data were statistically analysed by using analysis of covariance (ANCOVA). The experimental group had a significant improvement on the selected physiological variables than the control group.

**Saroja, (2011)** conducted a study to find out the effect of yoga practice, physical exercise and combination of yoga practice, physical exercise on selected motor ability components and physiological variables among college men students. For the purpose sixty college men students were selected as subjects at random from various colleges in Sivagangai district, Tamilnadu, India and their age was nineteen to twenty three years. They were divided into four groups namely yoga group, physical exercise group, yogic practice and physical



exercise combined group and control group. The first three groups did yoga asanas, pranayama, dhayana and physical exercise respectively for six weeks. The pre and post-test were taken for all the subjects before and after the training respectively. Dependent variables were motor ability components (flexibility, cardio respiratory endurance), physiological variables (resting pulse rate, breath holding time) and independent variables (yoga, physical exercise, combination of yoga and physical exercises group and control group) were selected. This study concluded that the level of flexibility improved greatly by selected yogic practices than that of physical exercises, and combined training of yogic practices than that of physical exercises and endurance. Physical exercises improved the cardio respiratory endurance greater than yogic practices. Yogic practices improved the resting pulse rate when compared to physical exercise.

**Thiyagachanthan, (2010)** conducted a study to find out the isolated and combined effect of yogic practices and physical exercises on selected physical, physiological and anthropometric variables among college men football players in Vellore district. The following physical variables namely speed, leg explosive power and agility, physiological variables namely resting pulse rate, blood hemoglobin, anaerobic power, and anthropometric variables namely chest girth, thigh girth and calf girth were selected as variables. For this study, one hundred and twenty men students from Vellore district, Tamilnadu were selected as subject at random and their age ranged from eighteen to twenty five years only, and they were divided into four groups namely Yogasana groups, physical exercise group and combination of physical exercise and yoga group and control group. The first group selected yogic practice, the second group physical exercises and third group both yoga, physical exercises respectively for twelve weeks. The pre-test and post-test were conducted for all subjects before the start of training and after the completion of training of twelve weeks. The study was formulated as a true random group design, consisting of a pre- test and post-test. In this study, analysis of covariance (ANCOVA) was used to test the adjusted post –test mean differences among the experimental groups. When the adjusted post-test result was significant, the Scheffe’s post hoc test was used to find out the paired mean significant differences. There was significant improvement in anthropometric variables such as chest girth, thigh girth, calf girth, physiological variables such as resting pulse rate, blood hemoglobin, and anaerobic power physical variables, such as speed, leg explosive power, and agility among college men

students in Vellore district. The combined training of yogic practices and physical exercises significantly improved the anthropometric variables such as chest girth, thigh girth, calf girth, physiological variables such as resting pulse rate, blood hemoglobin, anaerobic power physical variables, such as speed, leg explosive power and agility greater than that of yogic practices and physical exercises among college men students in Vellore district. Yogic practices significantly improved the anthropometric variables such as chest girth, thigh girth, calf girth, physiological variables such as resting pulse rate, blood hemoglobin, and anaerobic power, physical variables such as speed, leg explosive power and agility greater than that of physical exercises among college men students.

**Amutha, (2010)** conducted a study to find out the effect of selected yogic exercise and pranayama on anxiety, VO<sub>2</sub>max and flexibility. For this purpose fifty male students were selected from various high and higher secondary schools in and around Chidambaram town. They were divided into two equal groups. One as experimental group doing underwent training for nine weeks, weekly five days, Monday to Friday between 6.00 a.m. to 8.00 a.m.. Control group (n=25) did not participate in any special training. The result of the study indicated that the anxiety was reduced significantly, maximal oxygen uptake and the flexibility increased significantly for the training group. It was concluded that the yogic exercise had reduced the anxiety and increased the maximal oxygen uptake and flexibility.

**Divya and Shenbagavalli, (2010)** investigated to find out the effect of gymnastics exercises and yoga on selected physical, physiological and biochemical variables among college students. Ninety college women students were selected as subjects for this study and were divided into three groups namely control, yoga and gymnastics exercise groups. The age group of the subject was eighteen to twenty one years. To assess the effect of twelve weeks training for gymnastics and yogic programme the following dependent variables were chosen. Vital capacity, heart rate, breath holding time, systolic blood pressure, diastolic blood pressure, blood sugar, cholesterol, endurance, speed and abdominal strength. The obtained data were statistically analyzed through ANCOVA to test the significant difference and the result showed that the Gymnastic exercise and yogic training brought significant improvement among the college women on all variables except in diastolic blood pressure.

**Rajakumar, (2010)** in his study analyze the impact of yogic practices and physical exercises on selected physiological variables among the inter-collegiate soccer players. To achieve this purpose, sixty male inter-collegiate soccer players from various colleges at Chennai were selected at random. Their age ranged between seventeen and twenty two. The selected subjects were divided into three equal groups of twenty each, namely yogic practice group (Group A), physical exercises group (Group B) and control group (Group C). The experimental groups underwent twelve weeks of training through yogic practices and physical exercises respectively, whereas the control group (Group C) maintained their daily routine activities and no special training was given to them. The subjects of the three groups were tested using standardized tests and procedures on selected physiological variables before and after the training period to find out the training effects in the following test items. Resting pulse rate through stethoscope, breathe holding time through digital stop watch, peak flow rate through wright's peak flow meter. The collected data were analyzed statistically through analysis of covariance (ANACOVA) and scheffe's post hoc test to find out the pre and post training performances, compare the significant difference between the adjusted final means and the better group. The yogic practice group showed significant improvement due to twelve weeks training on resting pulse rate, breath holding time and peak flow rate compared to the physical exercise and control group. In the overall training, effects in terms of improved number of physiological variables and their magnitude of improvement through training, yogic practice group was found to be the better group.

**Jesintha and Parthiban, (2007)** studied the influence of yogic practices on resting pulse rate, breath holding time and cardio respiratory endurance of school kho-kho players. For the study thirty two school girls who were studying in Government higher secondary school kalanivasal, Pudukkottai district, Tamilnadu, India were selected as subjects randomly and assigned to two groups. Group I underwent yogic practices (n=16) and Group II (n=16) acted as control group. The data collected from the groups were statistically analyzed with analysis of covariance (ANCOVA). Resting pulse rate, breath holding time and cardio respiratory endurance showed significant difference between the groups.

**Ramesh, (2007)** investigated the effect of selected Yogasana and pranayama on selected physical and physiological variables of school boys. Agility, flexibility, systolic blood pressure, diastolic blood pressure and

pulse rate were selected as variables of the study. Thirty school boys were selected randomly as subjects. Their ages ranged from twelve to fifteen years. They were divided into two equal groups and assigned as experimental and control groups. The changes in the selected parameters were attributed to the regular practice of Yogasana and pranayama training. The results indicated significant increase in the efficiency of selected variables during eight weeks of training.

**Shanthameena, (2007)** examined the effect of Yogasana and aerobic training on the selected physiological and bio chemical variables of middle aged women. Thirty middle aged women were selected and first ten volunteers underwent twelve weeks training programme on Yogasana. The second ten volunteers underwent training programme on walking for thirty minutes. The third ten volunteers acted as control group. The suitable physiological and bio chemical parameters (blood pressure and cholesterol) were taken before and after the training programme for all the three groups. ANCOVA was used to analyze the data obtained. The results showed that there is greater improvement in blood pressure and cholesterol levels of the experimental groups.

**Padmadevi, (2007)** investigated the effects of yogic practices, physical exercises and combination of both the trainings on selected physiological and psychological variables of college girls. The resting pulse rate, cardio respiratory endurance and breath holding time as physiological variables, anxiety, aggression, achievement motivation and self-confidence as psychological variables. One hundred and twenty college women students were selected as subjects at random and their ages between seventeen to twenty years. Further, they were divided into four equal groups and the treatment was given as follows. Group I physical training, group II yogic practices and group III combination of both the training and group IV control group. Pre-test was conducted for the entire four groups prior to the training and the post test was conducted after six weeks of treatment. Analysis of covariance was used to find out the significant effects of the treatment groups. Scheffe's post hoc test was used to find out the paired mean significant difference. It was concluded that combination of both the training improves all the variables than other trainings.

**Samsudeen and Kalidasan, (2007)** investigated the influences of game specific field training and yogic practices on physical, physiological, psychological and performance variables among college level cricketers. Four matched group each having sixteen boys of eighteen to twenty five years of age served as subjects. Group

I was involved in game-specific field training, Group II was given game specific field training combined with yogic practices, Group III underwent yogic practices alone and Group IV (control) was not exposed to any specific training or conditioning. The training was administered for a period of twelve weeks, six days a week, two sessions each day and each game specific field training session lasted two hours. Yogic practices were met out for 45 minutes to group I and group III. Flexibility, endurance, resting pulse rate, breath holding time, sports competitive anxiety, self-confidence, and technical skill level were selected as parameters for the study. The standardized test was administered before and after the experimental treatment for all parameters barring technical skill. Three qualified coaches subjectively rated the technical skill level of each player before and after the treatment. Analysis of covariance was used to analyze the collected data the results indicated that the training groups I and group II produced positive impact on all the selected parameters. The analysis also revealed that game-specific field training combined with yogic practices (group II) showed significant improvement on all selected parameters among cricket players.

**Uthirapathy, (2005)** examined the effect of training in yogic practices and aerobic exercises on stress hormone, circulatory and metabolic responses among college players. Forty five over stressed subjects were selected randomly for the study. They were divided into three groups namely control group, aerobic exercises group and yogic practice group for an experimental period twelve weeks, six days a week. Control group was not given any sort of special training. The training effect of yogic practices had better influence on resting heart rate, systolic blood pressure, diastolic blood pressure, and blood sugar and serum cholesterol level.

**Gore, (2005)** conducted the study on the effect of six weeks yoga training on boys undergoing weight training. It was concluded that six weeks of yoga training was beneficial to five young weight lifters in the experimental group in comparison to five young weight lifters of the control group in respect of the improvement in chest circumference, blood pressure, peak expiratory flow rate and pulse rate.

**Telles, (2004)** investigated whether yoga reduced heart rate and whether the reduction would be more after thirty days of yoga training. Two groups yoga and control ( $n = 12$ ) were assessed on day one and day thirty. During the intervening thirty days, the yoga group received training in yoga techniques while the control group carried on with their routine. At each assessment the baseline heart rate was recorded for one minute. This was

followed by a six minute period during which participants were asked to attempt to voluntarily reduce their heart rate, using any strategy. Both the baseline heart rate and the lowest heart rate achieved voluntarily during the six-minute period were significantly lower in the yoga group on day thirty compared to day one by a group average of 10.7 beats per minute (bpm) and 6.8 bpm, respectively. In contrast, there was no significant change in either the baseline heart rate or the lowest heart rate achieved voluntarily in the control group on day thirty compared to day one.

**Harinath, (2004)** studied thirty healthy men in the age group of twenty five to thirty five years who volunteered for the study. They were randomly divided in two groups of fifteen each. Group I subjects served as controls and performed body flexibility exercises for forty minutes and slow running for twenty minutes during morning hours and played games for sixty minutes during evening hours daily for three months. Group II subjects practiced selected yogic asanas (postures) for forty five minutes and pranayama for fifteen minutes during morning, whereas during evening hours these subjects performed preparatory yogic postures for fifteen minutes, pranayama for fifteen minutes and meditation for thirty minutes daily, for three months. Orthostatic tolerance, heart rate, blood pressure, respiratory rate, dynamic lung function (such as forced vital capacity, forced expiratory volume in one second, forced expiratory volume percentage, peak expiratory flow rate and maximum voluntary ventilation ), and psychological profile were measured before and after three months yogic practices. Serial blood samples were drawn at various time intervals to study effects of these yogic practices and omkar meditation on melatonin levels. Yogic practices for three months resulted in an improvement in cardio respiratory performance and psychological profile. The plasma melatonin also showed an increase after three months of yogic practices. The systolic blood pressure, diastolic blood pressure, mean arterial blood pressure, and orthostatic tolerance did not show any significant correlation with plasma melatonin.

**Gore, (2003)** investigated the effects of yoga and aerobics training on cardio respiratory functions in obese people. As an outcome of one month programme of weight reduction using yoga practice and aerobics, female residential yoga group (FRYG) of twenty five to forty age range, showed a significant and consistent reduction in systolic blood pressure (SBP) in all the testing sessions. Their peak expiratory flow rate (PEFR) also



improved in two of the follow up (FU) testing sessions. FRYG of forty one to seventy age range reduced their SBP significantly in two of the FU sessions as well as a significant increase in the PEFR was recorded. Pulse rate (PR) did not show significant change. FNYRG (female non- residential yoga group) of twenty five to forty age ranges with the normal BP and PR initially, showed a significant reduction in DBP in two of the FU testing sessions, while the increase in the PEFR was not significant. FNRYG of age forty one to seventy showed a significant improvement in PEFR in post-test and first FU, yet reduction in BP was not significant statistically. Female aerobic group (FAG) of age range twenty five to forty showed non-significant reduction in BP and PEFR. However FAG of age range forty one to seventy reduced their BP significantly in second, third and sixth FU, but their PEFR and PR did not change significantly. Male residential yoga group (MRYG) of forty one to seventy age range did not show significant change in BP, and PEFR, however, MAG (male aerobic group) of same age range showed significant reduction in SBP only, in one of the FU testing sessions. Their PEFR showed non-significant reduction. MAG of age range twenty five to forty showed non-significant reduction in BP and PEFR.

**Jeyaveerapandian, (2000)** conducted a study on the outcome between physical exercises and yogic exercises on selected physical and physiological variables during off-season among the sports participants. Ninety subjects were selected randomly from various games and they were equally divided into three groups. After the experimental period (six weeks) the yogic exercises group showed significant improvement in abdominal muscular endurance, flexibility, heart rate and systolic blood pressure.

**Baldwin, (1999)** investigated the psychological and physiological differences between adult exercisers who added a weekly yoga class to their regular exercise program and those who did not. Subjects were pre tested and post tested for mood state, stress response, recovery heart rate, and spinal per hamstring flexibility. Over a period of eight weeks, subjects in both groups continued their normal exercise habits and maintained exercise logs. Subjects in the yoga group added a weekly yoga class. Subjects in the control group received a yoga class at a later time. At the end of eight weeks, exercise logs were collected and post tests were conducted. The results suggested: (1) more positive mood change in the yoga group over eight weeks, (2) more immediate positive effect from yoga than from cardiovascular or resistance training activities, (3) more compliance with



yoga than with cardiovascular or resistance training activities, (4) comparable perceived exertion ratings for 'moderate' hatha yoga and routine aerobic exercise, (5) an 8% gain in spinal and hamstring flexibility in the yoga group over eight weeks, and (6) decreased vulnerability to stress in the yoga group. Yogic exercises bring a variety of physiological and psychological benefits. Some yoga postures are intended to stretch and strengthen muscles. A few others try to improve posture and work on the skeletal system, while a few more aim to compress and release the organs and nerves. According to American yoga association (1999) yoga produces measurable physiological changes in the body such as a decrease in the respiratory rate and blood pressure. In addition, yoga helps an alteration in brain-wave activity and improves physical fitness and circulation.

**Telles, (1993)** studied the physiological changes in sports teachers following three months of training in yoga. The report shows that in a group of forty physical education teachers who already had an average of 8.9 years physical training, three months of yogic training produced significant improvement in general health (in terms of body weight and blood pressure reduction and improved lung functions). There was also evidence of decreased autonomic arousal and more of psycho physiological relaxation (heart rate and respiratory rate reduction) and improved somatic steadiness (decreased errors in the steadiness test). The changes at the end of three months in volar GSR in different direction (increase/decrease/no change), depending on the initial values, suggests that practicing yoga may help to bring about a balance in different autonomic functions, so that functioning is optimized.

**Brown R.P. and Gerbang P.L. (2009)** stated that Yoga breathing is an important part of health and spiritual practices in Indo-Tibetan traditions. Considered fundamental for the development of physical well-being, meditation, awareness, and enlightenment, it is both a form of meditation in itself and a preparation for deep meditation. Yoga breathing (pranayama) can rapidly bring the mind to the present moment and reduce stress. In this paper, they review data indicating how breath work can affect longevity mechanisms in some ways that overlap with meditation and in other ways that are different form, but that synergistically enhance, the effects of meditation. They also provide clinical evidence for the use of yoga breathing in the treatment of depression,

anxiety, post-traumatic stress disorder, and for victims of mass disasters. By inducing stress resilience, breath work enabled them to rapidly and compassionately relieve many forms of suffering.

**Benavides S. and Caballero L. (2009)** stated that the objective of this pilot study was to determine the effect of yoga on weight in youth at risk of developing type 2 diabetes. Secondly, the impact of participation in yoga on self-concept and psychiatric symptoms was measured. A 12-week prospective pilot Ashtanga yoga program enrolled twenty children and adolescents. Weight was measured before and after the program. All participants completed self-concept, anxiety, and depression inventories at the initiation and completion of the program. Fourteen predominantly Hispanic children, ages 8-15, completed the program. The average weight loss was 2 kg. Weight decreased from  $61.2 \pm 20.2$  kg to  $59.2 \pm 19.2$  kg ( $p=0.01$ ). Four of five children with low self-esteem improved, although two had decreased in self-esteem. Anxiety symptoms improved in the study. Ashtanga yoga may be beneficial as a weight loss strategy in a predominantly Hispanic population.

**Barshankar et al., (2003)** examined the effect of yoga on cardiovascular function in subjects above 40 years of age. Pulse rate, systolic and diastolic blood pressure and Valsalva ratio were studied in 50 control subjects (not doing any type of physical exercise) and 50 study subjects that had been practicing yoga for 5 years. From the study it was observed that significant reduction in the pulse rate occurs in subjects practicing yoga ( $P<0.001$ ) the difference in the mean values of systolic and diastolic blood pressure between study group and control group was also statistically significant ( $P<0.001$ ) and ( $P<0.001$ ) respectively). The systolic and diastolic blood pressure showed significant positive correlation with age in the study group ( $r_1$  systolic= $0.631$  and  $r_1$  diastolic= $0.610$ ) as well as in the control group ( $r_2$  systolic= $0.981$  and  $r_2$  diastolic= $0.864$ ). The significance of difference between correlation coefficient of both the groups was also tested with the use of Z transformation and the difference was Significant ( $Z$  systolic= $4.041$  and  $Z$  diastolic= $2.901$ ). Valsalva ratio was found to be significantly higher in yoga practitioners than in controls ( $P<0.001$ ). Our results indicate that yoga reduced the age related deterioration in cardiovascular functions.

**Selvanayagi (2002)** conducted a study on “Effect of selected asana, pranayama, and combination of asana and pranayama on systolic and diastolic blood pressure among college women”. For this study she selected 45 college women ranging between 18 to 22 years, and divided them in three groups that underwent training for

six weeks. ANCOVA was applied and it was concluded that systolic and diastolic blood pressure were not significantly improved by the influence of asana, pranayama and the combination of asana and pranyama.

**Ray (2001)** conducted a study on the effect of yogic exercise on perceived exertion (PE) after maximal exercise. Forty men from the Indian army aged 19-23 years were administered maximal exercise on a bicycle ergo meter in a graded workload protocol. The oxygen consumption, carbon-di-oxide output, pulmonary ventilation, respiratory rate, Heart rate at maximal exercise and PE score immediately thereafter were recorded. The subjects were divided into two equal groups. 12 subjects dropped out during the course of the study. One group (yoga, n=17) practiced hatha yogic exercises for 1 hour every morning (6 days in a week) for six months. The other group (PT, n=11) underwent conventional physical exercise training during the same period. Both groups participated daily in different games for one hour in the afternoon. In the seventh month, tests for maximal oxygen consumption (V02 Max) increased significantly ( $P<0.05$ ) in the yoga group showed no change. The practice of hatha yogic exercises along with games helped to improve aerobic capacity and the yoga group performed better than the PT group in terms of lower PE after exhaustive exercise.

**Ray, (2001)** undertook a study to observe the beneficial effects of yogic practices during training period on the young trainees. 54 trainees of 20-25 years age group were divided randomly in two groups i.e. yoga and control group. Yoga group (23 males and 5 females) was administered yogic practices for the five months of the course while control group (21 males and 5 females) did not perform yogic exercises during this period. From the 6th to 10th months of training both the groups performed the yogic practices. Physiological parameters like heart rate, blood pressure, oral temperature, skin temperature in resting condition: responses to maximal and sub maximal exercise, body flexibility were recorded. Psychological parameters like personality, learning arithmetic and psychomotor ability and mental well-being were also recorded. Various parameters were taken before and during the 5th and 10th month of training period. Initially there was relatively higher sympathetic activity in both the groups due to the new work/training environment but gradually it subsided. Later on at the 5th and 10th month, yoga group had relatively lower sympathetic activity than the control group. There was improvement in performance at sub maximal level of exercise and in anaerobic threshold in

the yoga group. There was improvement on various psychological parameters like reduction in anxiety and depression and a better mental function after yogic practices.

**Murugesan, Govindarajulu and Bera (2000)** selected thirty three (N=33) hypertensives, aged 35-65 years, from Govt. General Hospital, Pondicherry, and examined with four variables viz., systolic and diastolic blood pressure, pulse rate and body weight. The subjects were randomly assigned into three groups. The exp. Group-I underwent selected yoga practices, exp. Group-II received medical treatment by the physician of the said hospital and the control group did not participate in any of the treatment stimuli. Yoga imparted in the morning and in the evening with 1 hr/session, day-1 for a total period of 11-weeks. Medical treatment comprised drug intake every day for the whole experimental period. The result of pre-posttest with ANCOVA revealed that both the treatment stimuli (i.e. yoga and drugs) were effective in controlling the variables of hypertension.

**Madan Mohan (2000)** studied the effects of yoga training on cardiovascular response to exercise and the time course of recovery after the exercise. Cardiovascular response to exercise was determined by Harvard step test using a platform of 45 cm height. The subjects were asked to step up and down the platform at a rate of 30/min for a total duration of 5 min or until fatigue, whichever was earlier. Heart rate (HR) and blood pressure response to exercise were measured in supine position exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. Rate-pressure product ( $RPP = (HR \times SP)/100$ ) and double product ( $DoP = HR \times MP$ ), which are indices of work done by the heart were also calculated. Exercise produced a significant increase in HR, systolic pressure, RPP & DoP and a significant decrease in diastolic pressure. After two months of yoga training, exercise induced changes in these parameters were significantly reduced. It is concluded that after yoga training a given level of exercise leads to a milder cardiovascular response, suggesting better exercise tolerance.

**Schell, Allolio and Schoake (1994)** conducted a study on physiological and psychological effects of Hatha-Yoga exercise in healthy women. They measured heart rate, blood pressure, the hormones cortisol, prolactin and growth hormones and certain psychological parameters in a yoga practicing group and a control group of young female volunteers prior and after the experimental period. There were no substantial differences between the groups concerning endocrine parameters and blood pressure. The heart rate was significantly

different in yoga group having a significant decrease in heart rate during the yoga practice. In the personality inventory the yoga group showed markedly higher scores in life satisfaction and lower scores in excitability, aggressiveness, openness, emotionality and somatic complaints. Significant differences could also be observed concerning coping stress and mood at the end of the experiment. The yoga group had significant higher scores in high spirits and extra variedness.

**Scholl and others (1994)** examined the physiological and psychological effects of hatha yoga exercise in healthy women. Hatha yoga has become increasingly popular in western countries as a method for coping stress. However little is known about the physiological and psychological effects of yoga practice. We measured heart rate, blood pressure, the hormones cortisol, prolactin and growth hormone and certain psychological parameters in a yoga practicing group and a control group of young female volunteers reading in a comfortable position during the experimental period. There were no substantial differences between the groups concerning endocrine parameters and blood pressure. The course of heart rate was significantly different; the yoga group had a decrease during the yoga practice. Significant differences between both groups were found in psychological parameters. In the personality inventory the yoga group showed markedly higher scores in life satisfaction and lower scores in excitability, aggressiveness, openness, emotionally and somatic complaints. Significant differences could also be observed concerning coping with stress and the mood at the end of the experiment. The yoga group had significant higher scores in high spirits and extravertedness.

**Chinnasamy (1992)** conducted a study on effects of asanas and physical exercise on selected physiological and bio-chemical variables among school boys. In this study ninety male students were randomly selected from Government Higher Secondary School. The initial score was measured for the selected physiological and bio-chemical variables namely pulse rate, systolic blood pressure, diastolic blood pressure, hemoglobin content and blood sugar level. The treatment was given for a period of 6 weeks for the experimental group. The significance of the difference among two kinds of exercise group and asana group for the pre and post-test mean gain were determined by 'F' ratio through analysis of covariance. Asanas had significantly improved the hemoglobin content and reduced the blood sugar pulse rate and blood pressure.

**Durgalakshmi (1989)** conducted a study on “Effect of yogic exercises on selected physiological variables of High School boys”. The group consisted of 60 students. The result of the study showed that systolic pressure was increased and diastolic pressure remains unchanged after a six week training of yoga. The scores in breath holding time and vital capacity had also improved. It was statistically significant. She also recommended that the athletes could adopt these exercises and thereby increase in the cardio respiratory function and further she adds, yoga could be included in the regular programme of Physical Education in schools and colleges.

**Viajaykumari and Esther Ravi (2012)** revealed a study on physical and physiological influence of yogic practices among college women volleyball players. Forty intercollegiate women volleyball players were selected for this study. They were selected randomly and their ranged between eighteen to twenty three years. The players were assigned to two groups (n=20), Group I named as yogic exercise group and Group II names as control group did not involve any training during the training period of twelve weeks. The yoga training was given five days per week in the morning session for twelve weeks. The selected criterion variable was flexibility and it was measured before the commencement and after the training. The data were examined by ANCOVA to find out the significance difference. The result of the study concluded that the yogic practices improves the flexibility and also reduce the blood pressure and maintain the normal level for the women volleyball players.

**F.J. Schell, B. Allolio, and O.W. Schonecke, (1994)** examines Hatha-Yoga practice on physiological and psychological variables. Female subjects were tested on heart rate, blood pressure, the hormones cortisol, prolactin and growth hormone and certain psychological parameters in a yoga practicing group and a control group during the experimental period. There were no substantial differences between the groups concerning endocrine parameters and blood pressure. The course of heart rate was significantly different; the yoga group had a decrease during the yoga practice. Significant differences between both groups were found in psychological parameters.

**S. C. Raja. (2012)**, Effect of Yogic Practices on Flexibility Cholesterol and Blood Pressure, Online International Interdisciplinary Research Journal 2(6), 221-225, Effect of yogic practice on flexibility, total cholesterol and blood pressure (both systolic and diastolic). For this purpose, thirty male students studying in



various faculties (except physical education and fine arts) at Annamalai University in the age group of 18 – 25 years were selected. They were divided into two equal groups, each group consisted of fifteen subjects, in which group – I underwent yoga practice and group – II acted as control group who did not participate in any special training. The training period for this study was five days in a week for thirteen weeks. Prior to and after the training period the subjects were tested for flexibility, total cholesterol and blood pressure (systolic and diastolic). Flexibility was measured by conducting sit and reach test, total cholesterol was measured with the help of Boehringer Mannheim Kit method after taking 5 ml of blood, and blood pressure was measured with the help of Sphygmomanometer. Analysis of Covariance was applied as statistical tool. The result of the study has shown that the yoga practice group has improved the flexibility and also blood pressure (both systolic and diastolic) and there was no significant decrease in total cholesterol after the yogic practice.

**Gauri Shankar, (2011)** conducted a study on The Effect of Suryanamaskar Yoga Practice on The Heart Rate Blood Pressure, Flexibility and Upper Body Muscle Endurance in Healthy Adult Aim: To determine the effects of Suryanamaskar yoga practice on resting heart rate (HR), blood pressure (BP), flexibility and upper body muscle endurance in low to moderately active adult males and females. Methods: A total of 80 normal healthy subjects (40 males and 40 females) between age group 18-40 years from Sumandeep Vidyapeeth University were randomly assigned a yoga or control group. After a 1.5 hour introduction to proper Suryanamaskar techniques, the subjects were directed to perform two Suryanamaskar routines daily for 10 5Gauri Shankar and Bhavita Pancholi “The Effect of Suryanamaskar Yoga Practice on The Heart Rate, Blood Pressure, Flexibility and Upper Body Muscle Endurance in Healthy Adult” International Journal of Health Sciences & Research Vol. 01; Issue 01;( Oct. 2011); 2 minutes each followed by a 5 minute rest period, for duration of two weeks. Results: The post-hoc t test showed a significant ( $p=0.000$ ) increase in flexibility and push-ups and decreased blood pressure in yoga group, with little or no change in control group. Conclusion: Suryanamaskar is effective in increasing hamstring flexibility and improving upper body muscle endurance and helps to reduce blood pressure Sasi Kumar et. al.6 (2011) conducted a study on effects of Suryanamaskar on cardio vascular and respiratory in school students Back ground: Modern medical science has started to study the effects of Suryanamaskar and yogic techniques. With increasing scientific research in Suryanamaskar and yoga, its



therapeutic aspects are explored in wide angle. In yoga the sun is represented by surya nadi, the pranic channel which carries the vital life-giving force. Suryanamaskar is the combination of asana and Pranayama. Suryanamaskar has been integrated into physical education in many public and private schools across the country. The ultimate goal is to improve the physical health and increase the quantity of sportsmen with effective cardiorespiratory efficiency. Methods : This study was designed to evaluate the effects of a 45 days daily practice of Suryanamaskar on blood pressure(BP), heart rate(HR), respiratory rate (RR), forced vital capacity(FVC) and peak expiratory flow rate (PEFR) in school students of both sexes. 115 school students aged 10 to 14 years were recruited for the study. The participants were trained to perform Suryanamaskar for 45 days study period. The cardio vascular and respiratory parameters BP, HR, RR There are no sources in the current document. FVC and PEFR were measured before and after practice of Suryanamaskar. Results: The results showed that the Systolic blood pressure, PEFR and FVC increased significantly and RR, HR and diastolic blood pressure decreased significantly. Sasi Kumar, D V Sivapriya and Shyamala Thirumeni "Effects Of Suryanamaskar On Cardio Vascular And Respiratory Parameters In School Students" Recent Research In Science And Technology , Vol. 3 Issue;10 (June, 2011) : 19-24 after the practice of Suryanamaskar. Conclusion: The beneficial effects of Suryanamaskar can be applied to all schools to improve the physical health and sports activities of the students.

**Shenbagavalli & Divya, (2010)** conducted a study the Effect of Specific Yogic Exercises and Combination of Specific Yogic Exercises with Autogenic Training on Selected Physiological, Psychological and Biochemical Variables of College Men Students. The purpose of the study is to find out the effect of specific yogic exercises programme and combination of specific yogic exercises with autogenic training programme on selected physiological variables such as pulse rate, vital capacity, percent body fat, psychological variables such as job anxiety, occupational stress and biochemical variables such as high density lipoprotein, low density lipoprotein and fasting blood sugar of the college men students. Sixty Men students in the age group of 20 to 30 years from the Alagappa University were randomly selected and served as the subjects for the purpose of this study. The study was formulated as a random group design consisting of specific yogic exercises and combination of specific yogic exercise with autogenic training groups. The subjects (N=60) were at random

divided into three equal groups. Experimental group I - was administered specific yogic exercise group, Experimental group II- underwent combination of specific yogic exercises with autogenic training group and control group. All the groups were subjected to pre-test prior to the experimental treatment. The experimental groups participated in their respective duration of 12 weeks, six days in a week throughout the study. Analysis of Co-variance (ANACOVA) was applied to determine the significance of mean difference between the three groups. When F-ratio was found to be significant, the Scheffe.s Post Hoc test was applied to test the significance of pairs of the adjusted final group means. Practice of the combination of specific yogic exercises with autogenic training and specific yogic exercises programme is significantly effective in promoting desirable changes in the dependent variables.

**Gopal IP, (1973)** conducted a study on “Effect of yogasanas and Pranayamas on Blood Pressure, pulse rate and some respiratory functions”. In this study was Three groups of male volunteers in the age group of 20-35 years having the same average height and weight were studied. They were divided into 3 groups - yogic, Pranayamas, and nonyogic group and they were given training in their respective groups for six months and assessed for various cardio-respiratory parameters. When assessed after six months the yogic and the Pranayamic group showed a decrease in the pulse rate in the yogic and the trained group but not very significantly.

**Shanmugai (1993)** investigated “The effects of Asana and Jogging on Selected Physiological and Hematological Variables” Among school boys, asana were found to be more effective than jogging in improving pulse rate, vital capacity, breath holding time and serum cholesterol.

**Indirani (1993)** carried out a study on “The Effect of Yogasanas on selected Physical, Physiological and Psychological variables among school boys” The finding suggest that the asana effect was observed to be significant on flexibility and agility. Pranayama significantly improved breath holding capacity ,vital capacity and resting pulse rate.

**Adhikari (2008)** Effect of Yoga Practices on Occupational Stress among Indian Army personnel This study aimed at exploring the effect of a Yoga Training Programme (YTP) on Occupational Stress (OS)among serving

Indian army personnel at 4th Battalion Rajput Regiment, Sahajapur, UP. The programme spread over for 30 days, scheduled two sessions each day in the morning and evening, each session lasting 1.30 hour. The programme consisted of an integral yoga practice which included selected Asanas, Pranayamas, Prayer (Omkar & Gayatri Mantra Chanting) and Yoganindra. A sample of 60 army personnel ranging from the rank of jawan to junior commissioned officer participated in the study. Participants completed the standard self-reported Occupational Stress Index Test before and after the training programme. Result revealed that participants experienced a statistically significant reduction of stress at work place. The finding suggests the beneficial effects of yoga practices as well as yoga-based intervention.

**Dehkordi (2010).** Conducted a study of The Effect of eight weeks yoga training on high blood pressure in non-athlete females aged over 40 years in Ahvaz oil industry. A field quasi experiment was conducted to investigate the research problem. The relevant questionnaires were distributed among 317 females who enrolled in an oil company club as research population. 40 subjects showing blood pressure were randomly divided into two groups of yoga and control that subject took part in training protocol consisting of 8 weeks, 3 day a week and 60 minutes a day. Descriptive statistics and t-test were used to analyze the data. The comparison of gain scores means of two groups showed that yoga training significantly decreased high blood pressure.

**Shukla and Singh (2010)** study was to investigate Yoga for Stress Relief. The practice of yoga is well demonstrated to reduce the physical effect of stress on the body, and has even been found to lower cortisol levels. This effect is noticeable, and it is one of the primary reasons why people often take up yoga. People find that they feel more relax after practicing after practicing yoga. The asana, or physical postures of yoga, are helpful for reducing muscular tension, which reduces stress. We have a tendency to store stress not only in our nerves system, but distributed throughout the musculatures and other tissues of the body, our digestive system, for example, response very quickly to stress. Yoga can be a valuable and effective tool for releasing this stored stress. This can be true even for posttraumatic stress and recovering from the after effects of traumatic event. Yoga reduces stress by working on several different levels-physical, but also mental, emotional, and even spiritual to calm the body and the mind.

**Praveen Kumar, (2011)** studied the effect of yogic pranayama and meditation on selected physical and physiological variables. Thirty boys in the age group of 12 to 15 years were selected from Karnataka university department of yoga, Dharwad. The subjects were divided into two groups namely control group and Experimental group. The Experimental group was given yogic pranayama and meditation for a period of twelve weeks, both morning and evening on alternative days in a week. The control group did not participate in yogic pranayama and meditation training programmer. The collected data were statistically analyzed by using analysis of covariance (ANCOVA). The experiment group had a significant improvement on the selected physical and physiological variables except systolic and diastolic Blood pressure than that of control group.

**Shrama, P; Kendrick, K; Daniel, R. (2009)** evaluated the effect of Hatha Yoga on Stress and Recovery of Female Collegiate Athletes  
**PURPOSE:** To determine the acute effect of Hatha yoga participation on stress and recovery of collegiate female athletes (cross country, soccer and volleyball).  
**MEHOD:** Twenty five healthy female athletes were randomly divided into two groups, experimental (Yoga, Y; n=14, age = 19.3+1.3 years) and control (No Yoga, C; n= 11, age = 19.7+ 3.6 years). Hatha yoga was performed on four consecutive days, at 30-40 minutes per session, and consisted of breathing exercise, mediation, asanas/ postures, sun salute, and relaxation. Participants continued usual training with their respective teams. The Recovery-stress Questionnaire for Athletes (RESTQ-Sport) was completed 2 days before and one day after four consecutive days of yoga (Y) or no yoga (C).  
**RESULTS:** There was a significant decrease ( $p=008$ ) in global stress scores ( $2.8+$  to  $2.01+ 68$ ) for Y, but not C ( $2.60+55$ ) and C ( $2.95+ 70$  to  $2.95+61$ ,  $p= 527$ ) were unchanged pre to post.  
**CONCLUSION:** Hatha yoga practice appears to decrease stress in collegiate female athletes. Thus, appropriate incorporation in the training program may reduce negative effects of overtraining.

**Kulkarni, D.D. (2006)** evaluated the skin mill voltage measure as stress response indicator in yoga and non-yoga subjects. This study was conducted on the yoga practitioners of mixed genders on two separate sets. In Set-A the group I consists of yoga entrants (n=136) in the age range of 20-40 years having completed yoga course of various duration ranging from 45 days to one year and group II with yoga professionals (n=16) in the age range 40-60 years, practicing yoga at least above five years, whereas in the set B, the group III consists of professional yoga instructors (n=6) teaching yoga at least s decade and group IV is the control group (n=12)

that includes non-academic persons in the age group of 25-50 years, were tested for stress response level. The skin mill voltage (Skin mV) response data on four loads (electrical) viz. 10.R, 100R, 1K and 10K were collected on perception instrument. The results of A and B sets showed non-significant decrease in all loads indication on overall reduction in stress response. However, magnitude wise, the skin mV response in yoga experts of set A and yoga instructions of set B were higher compared to yoga entrants and control groups, inferring better relaxation response. This study concludes that the skin mV response can only indicate the stress response change. But the skin mV response cannot grade the intensity of stress response. It was therefore thought desirable to undertake this study with a view to co-relate skin mV response as the indicator of stress responses and testing the efficacy of yoga practice on the stress response. This can also useful to detect stress responses in various professionals. A random sampling technique was used to get the sample of yoga practitioners of mixed gender in two paired sets A and B with three different faculties such as research departments, clerical work, and students of Kaivaldhama S.M.Y. Saamiti, Lonavala, Pune. Each set consisting of two groups. The two groups of set a are divided according to age group, while other two groups of set b consists yoga and non-yoga subjects the same group. Group I includes students of mixed gender (n=15) in the age group of 40-60 practicing yoga at least above five years. Group III consists of male competent yoga instructors (n=6) within 25-50 age group, working in S.M.Y.M. Samiti, Kaivalyadhama, Lonavala, and teaching yoga more than five years. Group IV has been treated as Control (n=12). The group includes male staff members performing administrative and clerical works except on female, all in the age group from 25-50 years of the same institute.

**Panjwani, U. Gupta, H.L. Singh, S.H. Selvamurthy, W. and Rai, U.C. studied in 1995** about the effect of Sahaja yoga practice on stress management in patients of epilepsy. An attempt was made to evaluate the effect of Sahaja yoga meditation in stress management in patients of epilepsy. Method : The study was carried out on 32 patients of epilepsy who were randomly divided into 3 groups: group I subjects practised Sahaja yoga meditation for 6 months, group II subjects practised postural exercises mimicking Sahaja yoga and group III served as the epileptic control group. Galvanic skin resistance (GSR), blood lactate and urinary vinyl mandelic acid (U-VMA) were recorded at 0, 3 and 6 months. Results: There were significant changes at 3 & 6 months as

compared to 0 month values in GSR, blood lactate and U-VMA levels in group I subjects, but not in group II and group III subjects. The results indicate that reduction in stress following Sahaja yoga practice may be responsible for clinical improvement which had been earlier reported in patients who practiced Sahaja yoga.

**Bera, T.K. Gore, M.M. and Oak, J.P. studied in 1998** on Recovery from stress in two different postures and in Shavasana-- a yogic relaxation posture at Scientific Research Department, Kaivalyadhama S.M.Y.M. Samiti, Lonavla, India. Method: The recovery from induced physiological stress in Shavasana (a yogic relaxation posture) and two other postures (resting in chair and resting supine posture) was compared. Twenty one males and 6 females (age 21-30 years) were allowed to take rest in one of the above postures immediately after completing the scheduled treadmill running. The recovery was assessed in terms of Heart Rate (HR) and Blood pressure (BP). HR and BP were measured before and every two minutes after the treadmill running till they returned to the initial level. Results : The results revealed that the effects of stress was reversed in significantly ( $P < 0.01$ ) shorter time in Shavasana, compared to the resting posture in chair and a supine posture.

**Murugesan, R. Govindarajulu, N. and Bera, T.K. studied in 2000** on the Effect of selected yogic practices on the management of hypertension. Method : Thirty three ( $N = 33$ ) hypertensives, aged 35-65 years were examined with four variables including systolic and diastolic blood pressure, pulse rate and body weight. The subjects were randomly assigned to three groups: a yoga group, a group who received medical treatment by the physician of the said hospital and a control group. Yoga was offered in the morning and in the evening with 1 hr/session for 11- weeks. Medical treatment comprised drug intake every day for the experimental period. Results : The result of pre-post test revealed that both the treatment stimuli (i.e., yoga and drug) were effective in controlling the measures of hypertension.

**Ray, U.S. Mukhopadhyaya, S. Purkayastha, S.S. Asnani, V. Tomer, O.S. and Prashad, R. et. al. studied in 2001** on the Effect of Yogic Exercises on Physical and Mental Health of Young Fellowship Course Trainees. Method: The study was undertaken to observe any beneficial effect of yogic practices during training period on the young trainees. 54 trainees of 20-25 years age group were divided randomly in two groups i.e. yoga and control group. Yoga group (23 males and 5 females) was administered yogic practices for the first



five months of the course while control group (21 males and 5 females) did not perform yogic exercises during this period. From the 6th to 10th month of training both the groups performed the yogic practices. Physiological parameters like heart rate, blood pressure, oral temperature, skin temperature in resting condition, responses to maximal and submaximal exercise, body flexibility were recorded. Psychological parameters like personality, learning, arithmetic and psychomotor ability, mental well-being were also recorded. Various parameters were taken before and during the 5th and 10th month of training period. Initially there was relatively higher sympathetic activity in both the groups due to the new work/training environment but gradually it subsided. Later on at the 5th and 10th month, yoga group had relatively lower sympathetic activity than the control group. Results : There was improvement in performance at submaximal level of exercise and in anaerobic threshold in the yoga group. Shoulder, hip, trunk and neck flexibility improved in the yoga group. There was improvement in various psychological parameters like reduction in anxiety and depression and a better mental function after yogic practices.

**Geetanjali, S. Mahajan, K.K. and Sharma, L. studied in 2007** about Shavasana - Relaxation technique to combat stress. Method: The present study was undertaken on 60 young adults of both sexes to determine if Shavasana could be an effective tool to combat stress. Stress was experimentally induced by Cold Pressor Test (CPT) and effect was observed by recording its effect on cardio-respiratory parameters viz. systolic blood pressure, diastolic blood pressure, pulse rate, respiratory rate and rate pressure product. The study was divided into three setups. In the first setup, all parameters were recorded in basal state i.e. in supine position and after CPT. Second setup CPT was done after performing Shavasana for 10 min and for the third setup, effects of CPT were observed after subjects had undergone Shavasana training for 10 min daily for 4 weeks. Results: All basal parameters progressively statistically significantly decreased after performing Shavasana for 10 min and after its continuous practice for 4 weeks. Cold pressor induced stress showed statistically significant rise in all parameters in all the three setups but this rise was blunted and a progressively lower percentage increase was observed. It suggests that a person practicing Shavasana can successfully reduce the physiological effects of stress.



**Chattha, R. Raghuram, N. Venkatram, P. and Hongasandra, N.R. studied in 2008** on “Treating the climacteric symptoms in Indian women with an integrated approach to yoga therapy: a randomized control study”. I.e. to study the effect of yoga on the climacteric symptoms, perceived stress, and personality in perimenopausal women. Method: One hundred twenty participants (ages 40-55 y) were randomly divided into two study arms, ie, yoga and control. The yoga group practiced an integrated approach to yoga therapy comprising surya namaskara (sun salutation) with 12 postures, pranayama (breathing practices), and avartan dhyān (cyclic meditation), whereas the control group practiced a set of simple physical exercises under supervision of trained teachers for 8 weeks (1 h daily, 5 days per week). The assessments were made by Greene Climacteric Scale, Perceived Stress Scale, and Eysenck's Personality Inventory before and after the intervention. Results: Of the three factors of the Greene Climacteric Scale, the Mann-Whitney test showed a significant difference between groups ( $P < 0.001$ , independent samples 't' test) in the yoga group compared with controls (between-group analysis) with a higher effect size in the yoga group (1.10) than the control (0.27). On the Eysenck's Personality Inventory, the decrease in neuroticism was greater ( $P < 0.05$ ) in the yoga group (effect size = 0.43) than the control group (effect size = 0.21) with no change in extroversion in either the yoga or control group. Conclusions: Eight weeks of an integrated approach to yoga therapy decreases climacteric symptoms, perceived stress, and neuroticism in peri-menopausal women better than physical exercise.

**Michalsen, A. Grossman, P. Acil, A. Langhorst, J. Ludtke, R. Esch, T. Stefano, G.B. and Dobos, G.J. conducted an experiment in 2005** on Yoga to reduces stress and anxiety among distressed women. Method: The study design was a controlled prospective non-randomized trial. The participants were 24 self-referred women (mean age 37.9, +/- 7.3 years) who identified themselves as having high levels of stress, but did not have a psychiatric diagnosis (i.e., clinical depression or anxiety disorder). 16 women participated in the intervention first, while the 8 remaining women served as a wait-list control (and received the intervention later). The yoga intervention consisted of two weekly 90- min Iyengar yoga classes with a certified and experienced Iyengar instructor. The classes focused on poses that are hypothesized, in the Iyengar tradition, to reduce stress. These include backbends, standing poses, forward bends, and inversions. The study did not provide more details on the specific asanas or sequences practiced. Participants were also encouraged to

practice at home. Results: Compared to the wait-list control group, the yoga group showed significant reductions in stress, anxiety, fatigue, depression, headaches, and back pain. The yoga group showed significant increases in well-being techniques.”

**Granath, Ingvarsson, J. Thiele, S. and Ulrica, studied in 2006** about the Stress Management: a Randomized Study of Cognitive Behavioral Therapy and Yoga. Method: The program based on cognitive behavioral therapy principles was compared with a Kundaliniyoga program. A study sample of 26 women and 7 men from a large Swedish company were divided randomly into 2 groups for each of the different forms of intervention; a total of 4 groups. The groups were instructed by trained group leaders and 10 sessions were held with each of groups, over a period of 4 months. Results : Psychological (self-rated stress and stress behavior, anger, exhaustion, quality of life) and physiological (blood pressure, heart rate, urinary catecholamine's, salivary cortisol) measurements obtained before and after treatment showed significant improvements on most of the variables in both groups as well as medium-to-high effect sizes. However, no significant difference was found between the 2 programs. The results indicate that both cognitive behavior therapy and yoga are promising stress management.

**Chen KM and Tseng WS (2008):** conducted Pilot-testing of the effects of a newly-developed silver yoga exercise program for female seniors. This study aimed to pilot-test the health promotion effects of a silver yoga exercise program for female seniors. Using a one-group, pre-posttest design, a convenience sample of 16 community- dwelling female seniors was recruited. The silver yoga exercise intervention was administered three times a week, 70 minutes per session, for four weeks. Data were collected at baseline and after completion of the four-week intervention. Results indicated that participants' body fat percentage and systolic blood pressure decreased, balance and range of motion on shoulder flexion and abduction improved, and sleep disturbance was minimized (all  $p < .05$ ). Preliminary evidence supports that the silver yoga exercise program provides positive effects on the promotion of good health in female seniors living in the communities.

**Stephen (1974)** conducted, "An experiment on the effect of yoga on conflict resolution, self-concept and emotional adjustment. He used yoga therapy as psychotherapeutic tool to further examine psychotherapeutic effectiveness of yoga, transcendental meditation and the like. The result indicated that yoga therapy is an

effective method of stimulating positive changes in terms of conflict resolution between actual and desired behavior, feelings of the sense of self-esteem, self-identity, self- satisfaction, perception of one's behavior, physical self, moral- ethical self, personal self as well as defensiveness and emotional adjustment."

**Santosh Kumari (2005)** studied the "Impact of yogic shatkriyas, pranayamas and meditation on reducing stress of senior secondary students. Study reported that pre and posttest scores in different areas of academic stress of senior secondary school students who were provided training through meditation reduced stress among senior secondary school students of Experiment Group. All the t-values were significant at 0.1 level.

**Avalle and Vallumurgan, (2001)** conducted study with the purpose of the Effects of selected yogic exercise and psychological skill training on selected psycho physiological and psychomotor variables of high- level participants. To achieve the purpose of the present study, forty five intercollegiate level players from Maruti College of Physical Education, Coimbatore were selected as subjects at random and their ages ranged from 18 to 24 years. The subjects were divided into three equal groups. The variables selected were cognitive anxiety, Self-confidence, Heart rate, Systolic blood pressure, Diastolic blood pressure and Body temperature as psycho-physiological variables and Reaction time, and Hand eye Co-ordination as psychomotor variables. The study was formulated as a true random group design, consisting of a pre – test and post-test. The subject (n=45) were randomly assigned to three equal groups of fifteen men students each. The groups were assigned as psychological skills training (PST), yogic exercises (YE) and control group (CG) in an equivalent manner. The psychological skills training group and yogic exercises group participated for a period of twelve weeks and the post tests were conducted. Analysis of covariance statistical technique was used to test the adjusted mean difference among the three groups. When the adjusted post – test was significant, the Scheffe post hoc test was use to find out the paired mean differences. By analysis of covariance the cognitive anxiety was significant at 0.05 levels with F ratio of 9.66 as the table F ratio was 3.23 for adjusted means. By analysis of covariance the self-confidence was significant at 0.05 levels with a ratio of 29.78 as the table F ratio was 3.23 for adjusted means. By analysis of covariance the heart rate was significant at 0.05 levels with an F ration of 1.85 as the table F ratio was 3.23 for adjusted means. By analysis of covariance the systolic blood pressure was insignificant at 0.05 levels with F ratio of 0.96 as the table F ratio was 3.23 for adjusted mean. By analysis of

covariance the hand eye co- ordination was significant at 0.05 levels with F ratio of 1032.81 as the table F ratio was 3.23 for adjusted means. By analysis of covariance the reaction time was significant at 0.05 levels with F of 13.76 as the table F ratio 3.23 for adjusted means by analysis of covariance the body temperature was insignificant at 0.05 levels with F ratio of 1.28 an the table F ratio was 3.23 for adjusted means. The findings of the study showed that there was significant differences in the cognitive anxiety, somatic anxiety, self-confidence, and heart rate due to influence of yogic exercises and psychological skills training. In case of diastolic blood pressure, systolic blood pressure and body temperature there was insignificant differences due to yogic exercises and psychological skills training. The findings of the study shown that there was a significant difference in the hand eye co – ordination and reaction time due to influence of yogic exercises and psychological skills training. The findings of the study showed that there was significant difference in the self-confidence and hand eye coordination between the yogic exercises and psychological skills training group.

**Benavides and Caballer, (2001)** conducted study in the University of Texas, America to observe the effect of Ashtanga yoga on children and adolescent for weight management and psychological well-being. The objective of the pilot study was to determine the effect of yoga on weight in the youth at risk for developing type 2 diabetes. Secondly the impact of participation in yoga and self-concept and psychiatric symptoms was measured. Method: A 12 week prospective pilot astanga yoga programme 20 children and adolescents. Weight was measured before and after the programme. All participants completed self-concept, anxiety and depression inventories at the initiation and completion of the programme. 14 predominately Hispanic children, ages 8-15, completed the programme. The average weight loss was 2 kg., weight decreased from  $61.2 \pm 20.2$  to  $59.2 \pm 19.2$ kg ( $P=0.01$ ). Four of five children with low self-esteem improved, though two had decreases in self-esteem. Anxiety system improved in the study.

**Benavides and Caballeroa, (2002)** conducted study with the objective to determine the effect of yoga on weight in youth at risk for developing type II diabetes. Secondly, the impact of participation in yoga on self-concept and psychiatric symptoms was measured. A 12-week prospective pilot Ashtanga yoga program enrolled twenty children and adolescents. Weight was measured before and after the program. All participants completed self-concept, anxiety, and depression inventories at the initiation and completion of the program.

Fourteen predominately Hispanic children, ages 8–15, completed the program. The average weight loss was 2 kg. Weight decreased from  $61.2 \pm 20.2$  kg to  $59.2 \pm 19.2$  kg ( $p = 0.01$ ). Four of five children with low self-esteem improved, although two had decreases in self-esteem. Anxiety symptoms improved in the study. Ashtanga yoga may be beneficial as a weight loss strategy in a predominately Hispanic population.

**Baskara.P. (2012).** Conducted study on “Effect of Yogic Practices and Physical Exercises on Self – esteem and Stress variables among College Men”. To achieve the purpose of study 45 college men students were selected from the kandaswamy naidu college, Chennai and divided into three groups namely Yogic Practices group, Physical Exercises group and Control group, each group consist of 15 College Men, (Age 18 to 23 years). The following variables such as Self-esteem and Stress above selected variables were tested through standard questionnaire test. The pre-test were conduct before the experimental training. The experimental training were given to the experimental groups for the period of six weeks, the control group was not exposed to any experimental training. The post test conducted at the end experimental period. The Analysis of covariance (ANCOVA), Scheffe’s post hoc test was used. The result of the study shows that there was concluded that significant improvement in self-esteem and reduced level of stress due to the influence of yogic practices and physical exercises comparing to control group.

**Elavarasi. V & Gopinath. R. (2013).** Conducted study on “Effect of Yogic Practices and Physical Exercises on Flexibility and Blood Pressure among Working Women”. To achieve the purpose of study 45 sedentary working women were selected as subjects, divided into three groups namely group I yoga practices, group II physical exercise and group III control group, each group consist of 15 sedentary working women, (Age 35 to 40 years). The following variable namely flexibility and blood pressure (systolic and diastolic) above selected variable were tested through standard test. The pre-test were conduct before the experimental training. The experimental training were given to the experimental groups for the period of eight weeks, the control group was not exposed to any experimental training. The post test conducted at the end experimental period. The Analysis of covariance (ANCOVA), Scheffe’s post hoc test were used. The result of the study shows that there was a concluded flexibility has improved for both the experimental groups, such as yogic practices group and physical exercises group, when compared with the control group. The blood pressure has also decreased in

yogic practice group and physical exercise group when compared with the control group. No significant differences existed among both the experimental groups.

**Jayabal. D and Nagarajan. S. (2012)**, Conducted study on “Effect of Yogic Practices Physical Exercises and Combination Yogic Practices Physical Exercises on selected Motor Ability Component Physiological variable of College Men Students”. To achieve the purpose of study 60 College men were selected as subjects, divided into four groups namely experimental group I yoga group, experimental group II physical exercise group, experimental group III combination of yoga and physical exercise group and experimental group IV control group, each group consist of 20 College men, (Age 18 to 24 years). The following variable namely flexibility and resting pulse rate above selected variable were tested through standard test. The pre-test were conduct before the experimental training. The experimental training were given to the experimental groups for the period of six weeks, the control group was not exposed to any experimental training. The post test conducted at the end experimental period. The Analysis of covariance (ANCOVA), Scheffe’s post hoc test was used. The result of the study shows that there was a concluded that the level of flexibility was increased significantly due to six week of yogic practices, physical exercises and combination of both (yogic practices and physical exercises). The flexibility was significantly improved greater by selected yogic practices than that of physical exercises and combination training of yogic practices and physical exercises. Also physical exercise improves the flexibility greater than combined training. This study revealed that all types of training group increase flexibility. Resting pulse rate was significantly improved greater by selected combined activities was greater than the yogic practices. And also yogic practices improve the resting pulse rate greater than physical exercises.

**Satyapriya 2009)** studied the effect of integrated yoga practice and guided yogic relaxation on both perceived stress and measured autonomic response in healthy pregnant women. The 122 healthy women recruited between the 18th and 20th week of pregnancy at prenatal clinics in Bangalore, India, were randomized to practicing yoga and deep relaxation or standard prenatal exercises 1- hour daily. Perceived stress decreased by 31.57% in the yoga group and increased by 6.60% in the control group ( $P=0.001$ ). During a guided relaxation period in the yoga group, compared with values obtained before a practice session, the high-frequency band of



the heart rate variability spectrum (parasympathetic) increased by 64% in the 20th week and by 150% in the 36th week, and both the low frequency band (sympathetic), and the low-frequency to high frequency ratio were concomitantly reduced ( $P < 0.001$  between the 2 groups). Moreover, the low-frequency band remained decreased after deep relaxation in the 36th week in the yoga group. Yoga reduces perceived stress and improves adaptive autonomic response to stress in healthy pregnant women.

**Cohen (2009)** conducted a randomized controlled trial to assess the effects of 12 weeks of Iyengar yoga versus enhanced usual care (EUC) (based on individual dietary adjustment) on 24-h ambulatory BP in yoga-naïve adults with untreated pre hypertension or Stage 1 hypertension. In total, 26 and 31 subjects in the Iyengar yoga (IY) and enhanced usual care EUC arms, respectively, completed the study. There were no differences in BP between the groups at 6 and 12 weeks. Twelve weeks of Iyengar yoga IY produces clinically meaningful improvements in Systolic blood pressure SBP and diastolic blood pressure DBP.

**Dhungel (2008)** investigated the responses of alternate nostril breathing the nadisudhi pranayama on some cardio respiratory functions in healthy young adults. The subjects performed the Alternate Nostril Breathing exercise (15 minutes every day in the morning) for four weeks. Cardio-respiratory parameters were recorded before and after 4-weeks training period. A significant increment in peak expiratory flow rate and pulse pressure was noted. Although Systolic blood pressure was decreased insignificantly, the decrease in pulse rate, respiratory rate, diastolic blood pressure was significant.

**Khalsa (2004)** investigated the hemodynamics of a yogic breathing technique claimed "to help eliminate and prevent heart attacks due to abnormal electrical events to the heart," and to generally "enhance performance of the central nervous system and to help eliminate the effects of traumatic shock and stress to the central nervous system. Parameters for (4) subjects were recorded during a pre exercise resting period, a 31-minute exercise period, and a post exercise resting period, cardiac index, end diastolic index, peak flow, ejection fraction, thoracic fluid index, index of contractility, ejection ratio, systolic time ratio, acceleration index, and systolic, diastolic, and mean arterial pressures (MAPs). Left stroke work index (LSWI) and Stroke Systemic Vascular Resistance Index (SSVRI) were calculated. This technique induces dramatic shifts in all hemodynamic variables during the 1 BPM exercise and can produce unique changes in the post exercise resting period after



long-term practice that appears to have a unique effect on the brain stem cardio respiratory center regulating the Mayer wave (0.1-0.01 Hz) patterns of the cardiovascular system.

**Stachenfeld (1998)** Hypothesized that improvement in peak oxygen consumption ( $V_{O2peak}$ ) during training in older women is associated with specific central adaptations, such as blood volume expansion and a reduction in cardio pulmonary baroreflex control of vascular tone. Seventeen healthy older women were randomized into training and control groups. The training group exercised three to four times per week for 30 min at 60% peak heart rate for 12 weeks and then 40-50 min at 75% peak heart rate for 12 weeks. The control group participated in yoga exercises over the same time period. We measured resting blood volume (Evans blue dye),  $V_{O2peak}$ , and the forearm vascular resistance response to unloading low pressure mechanoreceptors during low levels of lower body negative pressure (through -20 mm Hg) before and after aerobic training. The slope of the increase in forearm vascular resistance (response) per unit decrease in central venous pressure (stimulus) was used to assess Cardio pulmonary baroreflex responsiveness. Aerobic training increased  $V_{O2peak}$  14.2% from 24.2%, a smaller improvement than typically seen in younger subjects. Blood volume and Cardio pulmonary baroreflex were similar before and after training.

**Brown, (2009)** provided clinical evidence for the use of yoga breathing in the treatment of depression, anxiety, post-traumatic stress disorder, and for victims of mass disasters. By inducing stress resilience, breath work enables us to rapidly and compassionately relieve many forms of suffering. Yoga breathing (pranayama) can rapidly bring the mind to the present moment and reduce stress, and reviewed data indicating how breath work can affect longevity mechanisms in some ways that overlap with meditation and in other ways that are different from, but that synergistically enhance, the effects of meditation.

**Chattha, (2008)** studied the effect of yoga on the climacteric symptoms, perceived stress, and personality in premenopausal women. One hundred twenty participants (ages 40- 55 years) were randomly divided into two study arms, i.e., yoga and control. The yoga group practiced an integrated approach to yoga therapy comprising surya namaskara (sun salutation) with 12 postures, pranayama (breathing practices), and avartan dhyana (cyclic meditation), whereas the control group practiced a lot of simple physical exercises under supervision of trained teachers for 8 weeks (1 h daily, 5 days per week). The assessments were made by Greene Climacteric Scale,

Perceived Stress Scale, and Eysenck's Personality Inventory before and after the intervention .They conducted this, eight weeks of an integrated approach to yoga therapy decreases climacteric symptoms, perceived stress, and neuroticism in perimen opuses women better than physical exercise.

**Ospina, (2007)** examined the efficacy and effectiveness of different meditation practices for the three most studied conditions; the role of effect modifiers on outcomes; and the effects of meditation on physiological and neuropsychological outcomes. Five broad categories of meditation practices were identified (Mantra meditation, Mindfulness meditation, Yoga, Tai Chi, and Qi Gong). Characterization of the universal or supplemental components of meditation practices was precluded by the theoretical and terminological heterogeneity among practices. Evidence on the state of research in meditation practices was provided in 813 predominantly poor-quality studies. The three most studied conditions were hypertension, other cardiovascular diseases, and substance abuse. Sixty-five intervention studies examined the therapeutic effect of meditation practices for these conditions. Meta-analyses based on low-quality studies and small numbers of hypertensive participants showed that TM(R), Qi Gong and Zen Buddhist meditation significantly reduced blood pressure. Yoga helped reduce stress. Yoga was no better than Mindfulness-based Stress Reduction at reducing anxiety in patients with cardiovascular diseases. No results from substance abuse studies could be combined. The physiological and neuropsychological effects of meditation practices have been evaluated in 312 poor-quality studies. Meta-analyses of results from 55 studies indicated that some meditation practices produced significant changes in healthy participants.

**Brown, (2005)** documented the benefits of programs that combine pranayama (yogic breathing) asanas (yoga postures), and meditation, there is sufficient evidence to consider Sudarshan Kriya Yoga to be a beneficial, low-risk, low-cost adjunct to the treatment of stress, anxiety, post-traumatic stress disorder (PTSD), depression, stress-related medical illnesses, substance abuse, and rehabilitation of criminal offenders. SKY has been used as a public health intervention to alleviate PTSD in survivors of mass disasters. Yoga techniques enhance well-being, mood, attention, mental focus, and stress tolerance. Proper training by a skilled teacher and a 30-minute practice every day will maximize the benefits. Health care providers play a crucial role in encouraging patients to maintain their yoga practices.

**Saptharishi, (2009)** measured the efficacy of physical exercise, reduction in salt intake, and yoga, in lowering BP among young (20-25) pre-hypertensives and hypertensives, and to compare their relative efficacies. A total of 113 subjects: 30, 28, 2B and 27 in four groups respectively participated for eight weeks: control (I), physical exercise (II) - brisk walking for 50-60 minutes, four days/week, salt intake reduction (III) - to at least half of their previous intake, and practice of yoga (IV) - for 30-45 minutes/day oft' at least five days/week, A total of 102 participants (29, 27, 25 and 21 in groups I, II, III and IV) completed the study. All three intervention groups showed a significant reduction in blood pressure. There was no significant change of blood pressure in control group (I).- Physical exercise was most effective (considered individually); salt intake reduction and yoga were also effective.

**Schmidt, (1997)** studied the participants of a comprehensive residential three month yoga and meditation training programme living on a low fat lacto-vegetarian diet changes in cardiovascular risk factors and hormones Substantial risk factor reduction was found. Body mass index, total serum and LDL cholesterol, fibrinogen, and blood pressure were significantly reduced especially in those with elevated levels. Urinary secretion of adrenaline, noradrenaline, dopamine, aldosterone, as well as serum testosterone and luteinizing hormone levels were reduced, while cortisol excretion increased significantly.

### CHAPTER-III

#### METHODOLOGY

As discussed earlier, the main purpose of the study was to find out the effects of Yogasana selected on physiological and Psychological variables of High school Girls. In order to accomplish the purpose Yogasana training was carried out and selected physiological and psychological test were administered.

The procedure adopted in the present research work is related to the selection of subjects, selection of variables, training procedures, Experimental design, Selection of tests, orientation of the subjects, Pilot study, collection of data, Administration of the tests and statistical technique involved in the study.

### Selection of Subjects

The Purpose of the study was to find out the “Effects of Yogasana on Physiological and Psychological Variables of High School Girls”. To achieve this purpose 140 Female high school girls were selected in the age group ranging from 13 to 16 years studying in Government high school of Jamakhandi District of Karnataka state were selected randomly as subjects were divided into two equal groups of seventy each known as Experimental group and Control group.

**Table No. 1 illustrates the group and total number of samples used for the study**

Experimental Group	Control Group	Total
N-70	N=70	140
High School Girls	High School Girls	High School Girls

### Selection of variables

The investigator reviewed through the available relevant related literature and discussed with the experts in the field and also discussed with the research guide before selection of variables for the present research work. The researcher used the availability of technique based on the data researcher done the analysis regarding feasibility; Reliability and the outcome of the results were taken care of before finalizing the variables. The variables selected for the present research work physiological and psychological variables.

### Independent Variables - Yogasana Training

**Table No 2. Selected independent Yogasana for the training of experimental group**

Sitting	Standing	Prolain Asanas	Supain Asanas
Pachimothanasana	Hasthpadanhustasana	Halasana	Dhanurasana
Ustrasana	Hastauthanasana	Navasana	Bhujangasana
Ardhamastendrasana	Trikonasana	Sarvangasana	Rajakpotasana
Vajrasana	Ardhachakrasana	Chakrasana	Shalabhasana
Supthvajrasana	Garudasana	Mastyasana	Makarasana

**Table No 3. Selected dependent variables for the study**

Dependent Variables	
Physiological Variables	Psychological Variables
Resting Pulse Rate	Stress
Blood Pressure	Self Confidence
VO <sub>2</sub> Max	

**Table No 4. Schedule of Yogasana Training for the study**

Sr. No	Yogasana	Time
	Warm up	10 minutes
<b>01</b>	<b>Sitting Asanas</b>	<b>40 minutes (Yogasana Practice)</b>
	Pachimothanasana, Ustrasana, Ardhamastendrasana, Vajrasana, Supthvajrasana	
<b>02</b>	<b>Standing Asanas</b>	
	Hasthpadanhushtasana, Hastauthanasana, Trikonasana, Ardachakrasana, Garudasana	
<b>03</b>	<b>Prolain Asanas</b>	
	Halasana, Sarvangasana, Chakrasana, Mastyasana, Navasana	
<b>04</b>	<b>Supain Asanas</b>	<b>10 minutes</b>
	Dhanurasana, Bhujangasana, Rajakpotasana, Shalabhasana, Makarasana	
	<b>Relaxation</b>	<b>10 minutes</b>
	<b>Total</b>	<b>60 minutes</b>

### Experimental design

The study was formulated as pre and post-test random group design, in which 140 female students were divided into two equal groups. The experimental group I (N=70) Underwent Yogasana. The training period of an Experimental group was 16 weeks 6 days per week for duration of 60 minutes. The control group II (N=70) did not undergo any specific training rather than their routine work.

### Selection of Tests

The test items were selected for this study after thorough review of literature as well as consultation with experts, Physical Education Professionals, and also Research supervisor. The selection tests and the criterion variables are presented in the Following table no 5.

**Table No 5. The selection tests and the criterion variables**

Sl. No	Test Items and tools	Variables	Criterion Measurement
01	Radial pulse rate	Resting pulse rate	Pulse index and middle fingers together on the opposite wrist, about $\frac{1}{2}$ inches on the inside of the joint, in line with the index finger. Once pulse is located count the number of beats felt within a one minute period and recorded.
02	Harvard step test	Vo2 max	The total numbers of heart beats was counted between 1 to 1.5 minutes, between 2 to 2.5 minutes and between 3 to 3.5 minutes after finishing the step of test.
03	Sphygmomanometer	Blood Pressure	The stethoscope is placed over the brachial artery in the cubital fossa. The pressure is released at a rate of approximately 2 Mm/Hg per second.
04	Questionnaire developed by Dr.(Mrs.)Vijaya Lakshmi	Stress	As per the Standard Questionnaire
05	Questionnaire developed by M. Basavanna	Self-Confidence	As per the Standard Questionnaire

### Orientation of the Subjects

The investigator explained the purpose of the study and the importance of the training programme to the subjects in order to get their co - operation as well as to secure reliable data. A few days were spent to teach various Yogasana Training involved in the training prior to the commencement of the training programme.

### Pilot Study

The Researcher wanted to know the Effects of Yogasana Training on Physiological and Psychological Variables of high school girls Development. For the purpose of pilot study the researcher selected 70 female subjects for the study. Pre- test was administered and recorded. Then the Researcher was given one month training on Yogasana Training. The post test was administrated soon after the one month training. The Researcher compared the pre and post test Results. The post test Results indicated significant development in Physiological and psychological Variables.

### **Collection of Data**

The data were gathered by conducting pre and post-test Physiological Variables to measure Resting pulse rate (Radial pulse rate), Vo2 max (Harvard step test) and Blood Pressure (Sphygmomanometer). Psychological variables by using questionnaire for Stress and Self –confidence

### **Administration of tests**

#### **Stature**

Stature (standing height) is defined as the erect body length from the sole of the feet to the vertex (the highest point) of the head. The subjects, in bare feet, stood erect with their heels almost touching each other. Heels, buttocks, upper part of the back, and rear of the head were in contact with the vertical face of a standard stadiometer. The head was held upright and the eyes looked straight ahead. The chin was tucked in slightly and the arms were permitted to hang to the side in a natural manner. The examiner stretched the subject by cupping the head and applying gentle traction at the mastoid process, while making sure that the heels were not elevated. (Figure 5). The subject was asked to take a deep breath. While the subject was in this position the head piece of the stadiometer was moved down to the vertex of the head held in position firmly. The subject then stepped away from stadiometer. The examiner recorded the vertical distance from the platform to the head piece. The measurement was recorded to the nearest one-half of a centimeter.

#### **Body Weight**

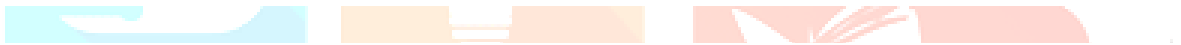
The subject was requested to stand on the centre of the platform of a spring weighting machine. This measured up to one tenth of a kilogram. The subject was weighed while wearing a light swimming trunk and with bare feet (Figure 06). The weight was recorded in kilograms to the nearest one tenth of a kilogram.

#### **Paschimottanasana**

#### **Procedure**



- Sit down straight with the legs together by stretching in front of the. Keep the head neck and spine erect.
- Place the palms on the respective knees.
- Now bend the head and trunk slowly forward to catch the toes with the thumb, index and middle fingers without bending knees.
- Take a deep breath and exhale slowly. Try to touch your head to your both knees as shown in above image.
- Bend the arm and try to touch the elbow on the floor.
- Exhale completely and holding out he breathe stay in this posture for a few seconds.
- After few seconds slowly return to the starting position.
- Breathe normally.
- Repeat this for 3-4 times.



## Benefits

- It acts as a stress reliever.
- Reduces fatty deposits in the abdomen
- Remove anxiety, anger, and irritability.
- Calms the mind
- Stretches the spine and brings flexibility.
- Good for constipation and digestive disorder.
- Useful for increasing height
- Regular practices cure impotency and enhance the sexual power.
- Tones the abdominal-pelvic organs.
- Balance the menstrual cycles.
- This asana is recommended especially for women after delivery.



**Plate – I. Subject performing the Paschimottanasana**

## Ustrasana

- Kneel on the ground or the yoga mat while at the same time placing the hands right on the hips.
- Make sure that the knees are in line with the shoulders.
- The sole of the feet must be facing upwards.
- Draw in the tail-bone close towards the pubis as inhale so that it feels like it is being pulled from the navel.
- Arch your back simultaneously and slide the palms right over the feet so that the arms remain straight.
- Under no circumstances they should flex or strain the neck; make sure that they keep the neck in neutral position.
- Remain in this posture at least for a few breaths.
- Gently breathe out and gradually bring your body back to initial pose.
- Smoothly withdraw the hands while bringing them back to the hips just as they get to your original position

## Benefits

- These are the main benefits of practicing Ustrasana

- Ustrasana can help in stretching the abdomen, chest, quadriceps and the hip flexors.
- This asana can improve spinal flexibility.
- It can effectively strengthen the back and shoulder muscles as well as the arms and thighs.
- The asana helps to tone the organs of the abdomen, neck and pelvis
- The asana can reduce the fat on thighs
- It can also loosen up and improve the functioning of the vertebrate
- Ustrasana enhances the functioning of the hips and works on the posture.
- It can energize the body and bring down the levels of fatigue and anxiety.
- The asana stimulates the endocrine glands, digestive system and kidneys.
- It can stretch the abdomen as well as cure the signs of constipation.
- Improves and stimulates the nervous and respiratory systems by enhancing blood circulation.
- It can help in achieving calmness, enhancing mental focus and concentration as well as creativity and imagination.
- It activates the thyroid glands.
- Ustrasana can help in the healing and balancing of chakras.
- It can minimize menstrual discomfort



**Plate – II. Subject performing the Ustrasana**

## Ardha Matsyendrasana

### Procedure

- Kneel down with the legs together, resting on the heels.
- Then sit to the right of the feet as illustrated below.
- Lift the left leg over the right, placing the foot against the outside of the right knee. Bring your right heel in close to the buttocks. Keep the spine erect.
- Stretch the arms out to the sides at shoulder level, and twist around to the left.
- Now bring the right arm down on the outside of the left knee and hold the left foot in the right hand, placing your left hand on the floor behind them, Exhaling, twist as far as possible to the left. Look over the left shoulder.

### Benefits

- Increase hips and spine flexibility.
- Removes the wastes and improves digestion
- Stimulate heart, kidneys, liver, spleen and lungs.
- Open the neck, hips and shoulders.
- Relieve fatigue, sciatica, backache and menstrual discomfort.
- Releases excess toxins and heat from tissues and organs.
- Energizes and stretches the backbone.



**Plate – III. Subject performing the Ardha Matsyendrasana**

## Vajrasana

### Procedure

- Sit on the flat floor in Dandasana or fold your both legs and place your feet under the hips. (Both heels are protruding outwards and the toes are touching your hips, in this position the thumbs of both toes should be touching each other)
- Keep your spine and head erect with closed eyes.
- Your knees should be touching each other.
- Keep your right palm on right knee and left palm on left knee.
- After that inhale slowly and exhale slowly by both nostrils. (Normal breathing).
- When you breathe out try to assume that all your disorders are coming out from your nostrils.
- In the beginning, try to practice Vajrasana for 5 minutes after lunch or dinner. Once you are used to it increases the time of asana about 30 minutes to 60 minutes.

## Benefits

- It is the best Asana for meditation and concentration.

- Helps in keeping the mind stable and calm
- Cures indigestion, acidity, gas formation and constipation, increases digestion process
- Those people who are suffering from gas problems can practice immediately after lunch or dinner.
- Helps in back pain
- Very beneficial in stomach disorders
- Beneficial in urinary problems
- Strengthens the sexual organs
- Helps to reduce obesity
- Gives Strength to the thigh muscles
- Useful for arthritis patients
- Relieving pain in the knees



**Plate – IV Subject performing the Vajrasana**

## **Supta Virasana**

### **Procedure**

- First get into the pose of Virasana (Hero Pose).
- Keep your hands beside your sides.
- Breathe out and lean backwards towards the ground.
- Put your weight on to your hands and after that your elbows and lower arms.
- When you are inclining toward your elbows, place your hands at the back (on the pelvis)
- Then discharge the buttocks and lower back by forcing/pushing yourself downwards towards your tailbone.
- You may finish reclining by going towards the floor or by reclining with support.
- You can use two blankets of same height for your support. These blankets help you while you are leaning downwards.
- Remain in the position for about 30 to 60 seconds or up to 60 seconds.
- Once you are master in it, you can hold it for 5 minutes.

## Benefits

- Strengthens your aches and stretches your quadriceps.
- Supta Virasana is beneficial in the treatment of sciatica.
- Reclined Hero pose helps in sleeping disorders like insomnia.
- Improves digestion
- It helps to relieve menstrual pain symptoms.
- Stretches your abdomen, deep hip flexors, ankles and thighs
- Asthma and other diseases like arthritis can also be treated by this pose.
- It is beneficial in headaches, colds, flat feet, infertility, and menstrual problems e.t.c.





**Plate – V Subject performing the Supta Virasana**

## **Hasta Padahastasana**

### **Procedure**

- Stand straight with feet together and arms alongside the body.
- Balance your weight equally on both feet.
- Breathing in, extend your arms overhead.
- Breathing out, bend forward and down towards the feet.
- Stay in the posture for 20-30 seconds and continue to breathe deeply.
- Keep the legs and spine erect; hands rest either on the floor, beside the feet or on the legs.
- On the out breath, move the chest towards the knees; lift the hips and tailbone higher; press the heels down; let the head relax and move it gently towards the feet. Keep breathing deeply.
- Breathing in, stretch your arms forward and up, slowly come up to the standing position.
- Breathing out, bring the arms to the sides.

## Benefits

- Stretches all the muscles of the back of the body
- Invigorates the nervous system by increasing the -blood supply
- Makes the spine supple
- Tones the abdominal organs



**Plate – VI Subject performing the Hasta Padahastasana**

## Hasta Uttanasana

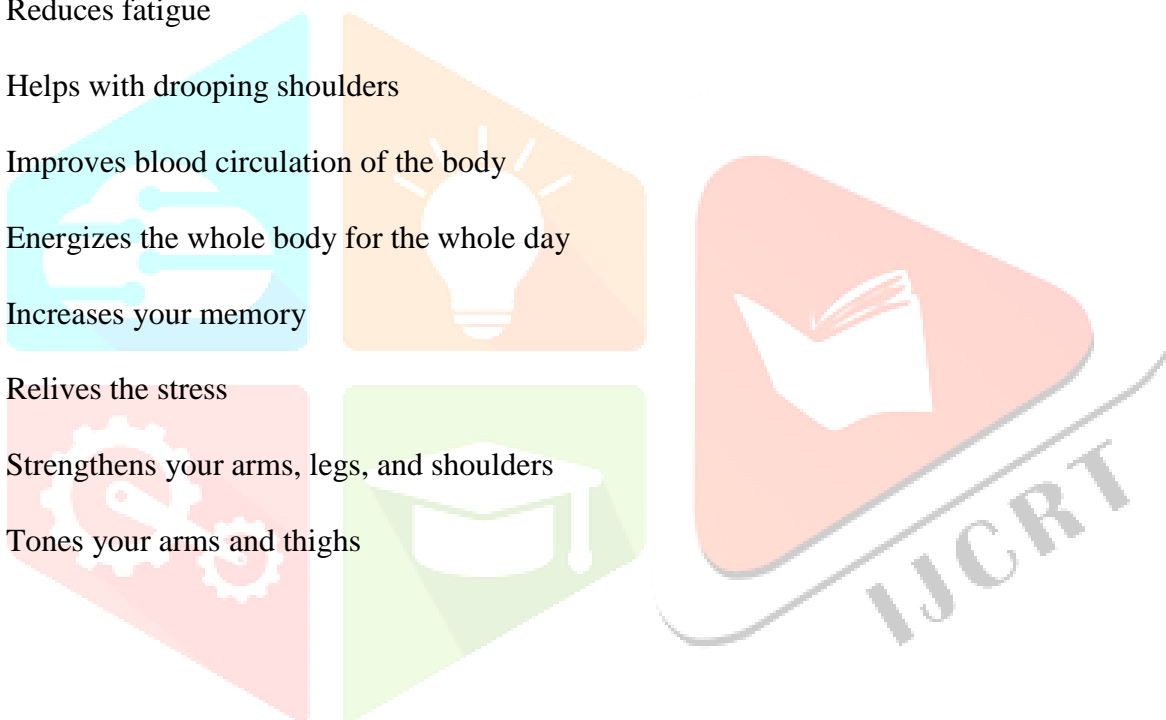
### Procedure

- Stand erect and raise both the hands above the head.
- Let there be shoulders length between the two arms.
- Bend the trunk and head backwards to create a slight curve.
- Raising the arms and bending the trunk backwards is done at the same time. Breathe in deeply while raising the arms.

## Benefits

Hasta Uttanasana is known to have many benefits. The benefits of Hasta Uttanasana are

- Improves your digestion
- Stretches your arms, spine, abdomen, and chest area
- Improves your respiratory functions
- Hasta Uttanasana also helps with weight loss
- Stretches and tones your abdomen muscles
- Reduces fatigue
- Helps with drooping shoulders
- Improves blood circulation of the body
- Energizes the whole body for the whole day
- Increases your memory
- Relieves the stress
- Strengthens your arms, legs, and shoulders
- Tones your arms and thighs





**Plate – VII Subject performing the Hasta Uttanasana**

### **Trikonasana**

#### **Procedure**

- Stand upright and place your legs about three and a half to four feet apart.
- Make sure your right foot is placed outside at 90 degrees and the left foot is placed in at 15 degrees.
- Align the center of your right heel with the center of the arch of the left foot.
- You need to remember that your feet are pressing the ground, and the weight of your body is balanced equally on both feet.
- Take a deep breath, and as you exhale, bend your body to the right from below your hips, ensuring your waist is straight. Lift your left hand up and let your right hand touch the ground. Both your arms should form a straight line.
- Depending on the level of comfort, rest your right hand on your shin, ankle, or outside the right foot on the floor. No matter where you place your hand, make sure you do not distort the sides of your waist.

Quickly check on your left arm. It should be stretched out towards the ceiling and in line with the top of your shoulder. Let your head sit in a neutral position or turn it to the left, with your gaze set on your left palm.

- Your body should be bent sideways, and not backward or forward. Your chest and pelvis should be wide open.
- Stretch to the fullest, and focus on stabilizing your body. Take deep, long breaths. With every exhalation, try and relax your body more.
- Inhale and come up. Drop your arms to your side and straighten your feet.
- Repeat the same using the left leg.

## Benefits

Take a look at the amazing Trikonasana benefits.

- It strengthens the knees, ankles, legs, chest, and arms.
- It completely stretches and opens up the groins, hips, hamstrings, and calves and also the chest, spine, and shoulders.
- It increases both physical and mental stability.
- It improves digestion and stimulates all the abdominal organs.
- It helps reduce back pain and sciatica. It also serves as a therapy for flat feet, osteoporosis, neck pain, and infertility.
- It reduces stress and cures anxiety.



Plate – VIII Subject performing the Trikonasana

### Ardha Chakrasana

#### Procedure

- Stand straight like Tadasana (Mountain Pose).
- Now while inhaling raises your hand up straight and bend backward as shown in above image.
- You can hold your hips with your hands and bend backward without bending knees.
- Hold this position for few seconds and continue breathing slowly.
- Now while exhaling, come back to the starting position.
- Repeat this cycle for 3-5 times.

#### Benefits

- Effective to reduce stomach and thighs fat
- Stimulates pancreas and controls high blood sugar

- Improves lungs capacity
- Brings flexibility to your spine and back muscles
- Tones arms, thighs, waist, and shoulders
- Relieves pain in neck and shoulders
- One of the best exercise to get relief from back pain
- Cures respiratory disorders
- Stimulates abdominal organs
- Good exercise for heart health
- Regulates blood pressure
- Stretches your stomach, intestine and abdomen organs
- Effective to relieve menstrual disorders



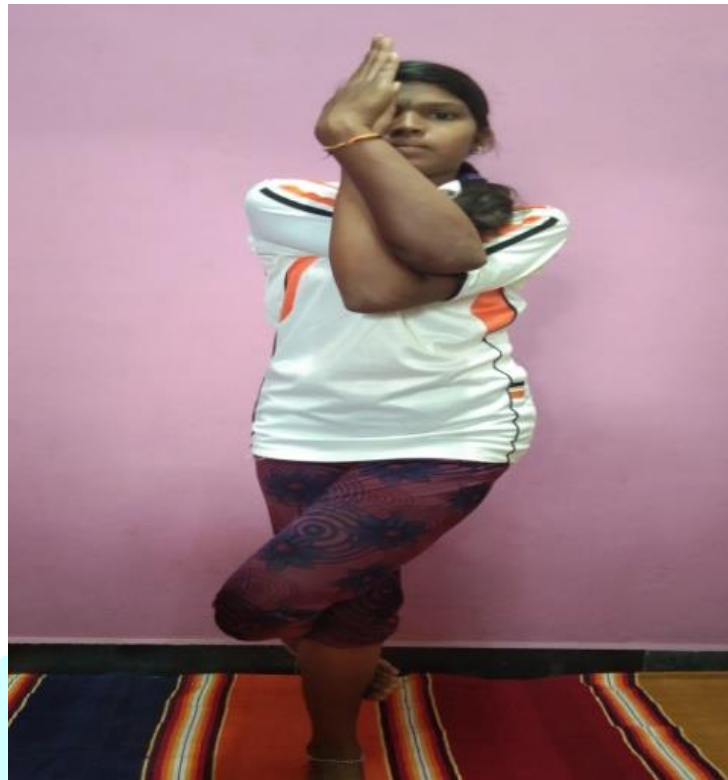
**Plate – IX Subject performing the Ardha Chakrasana**



- Stand straight with your legs together.
- Bend your both knees and cross your left over your right such that your left thigh is over the right thigh.
- Press your right foot firmly on the floor and toes of your left foot should be pointing downwards.
- Now stretch your hands in front of your chest such that they are parallel to the floor.
- Bend your elbows and cross your forearms joining your palms.
- Stay in this posture for 7-10 breaths (each breath must be 6-8 seconds).
- Now slowly release your hands place them beside your body.
- Release your left leg, straighten your legs and relax.
- Repeat it with the right leg crossed over the left.

### Benefits

- It helps in stretching the thighs, hips, upper back, and shoulders.
- It helps in improving balance.
- It helps in strengthening the calves.
- It helps in relieving sciatica and rheumatism.
- It helps in improving the flexibility.



**Plate – X Subject performing the Garudasana**

## **Halasana**

### **Procedure**

- Lie on the yoga mat or carpet and join the legs together
- Raise your legs to make an angle of 90 degree.
- Thrust the palms, raise the waist and legs, bending forwards curving the back and resting the legs on the floor above head.
- Try to place the big toe on the floor and keep the legs straight.
- Balance the whole weight on the shoulder blade, shift both the hands over the head, join the fingers and hold the head with it and relax the elbows on the floor.
- Try to remain in the position till the the count of 100.
- Then release the fingers above the head, pressing the pals on the floor taking back thumb toe gently bring the body and legs to the floor

- Relax and practice for 2 round more.

## Benefits

- Practicing this asana regularly can avoid disease like diabetes, obesity, constipation, stomach disorder, Blood pressure and menstrual disorders
- It makes your back bone elastic and flexible.
- Halasana helps to reduce both belly and body fat.
- It improves memory power



**Plate – XI Subject performing the Halasana**

## Sarvangasana

### Procedure

- Lie down on your back straight.
- Breathe in and breathe out, lift your both legs in the upward direction.
- Stop at that point when both legs make a 90-degree angle with the floor.
- Make the Uttanpadasana Posture.
- While exhaling lifts your waist; push your legs back over the head.
- Use your both hands for supporting waist.

- Get your legs, back, and waist in one straight line.
- Stretch your toes towards the sky, keep your eye on your toes.
- Hold the position for some time, keep normal breathing.
- Slowly get back to initial position.
- Repeat this for three to four times.

## Benefits

- Controls and cures the issues related to genital organs
- Beneficial in constipation
- Cures varicose veins and hemorrhoids
- Useful in problems related to Ears, nose, and throat
- Vivified the blood circulatory system, digestive system, and respiratory system
- Freshen the thyroid gland; coz during pose lots of blood flows towards the throat
- Cures for sexual disorders
- Control and helps to restore seminal fluid loss through night wetting or Masturbation.
- Beneficial in Asthma, diabetes, liver disorders and intestinal disorders
- Controls shrinking of skins and wrinkles in the face



## Plate – XII Subject performing the Sarvangasana

### Chakrasana

#### Procedure

- Lie down on your back with feet apart, bend your knees and place your feet on the ground close to your body.
- Now bring your palms under your shoulders such that the fingers point towards the shoulders and the elbows are shoulder-width apart.
- Inhale and press your palms firmly into the floor.
- Lift your shoulders and elbow firmly into the floor
- Your Feet should be pressed firmly into the floor.
- Inhale and lift your hips up.
- The spine should be rolled up so that it may seem to resemble a semi-circular arch or wheel.
- Straighten out your arms and legs as much as possible so that the hips and chest maybe pushed up.
- Hold this pose for at least 15-30 seconds.
- To go back to original, bend your elbows to lower your head and shoulders to the floor.
- Then bend your knees and bring your spine and hips back to the ground and relax.

#### Benefits

- Chakrasana strengthens liver, pancreas, and kidneys
- Excellent for the heart
- Good for infertility, asthma, and osteoporosis
- Wheel Pose Strengthens arms, shoulders, hands, wrists, and legs
- Stretches the chest and lungs
- Strengthens the arms and wrists, legs, buttocks, abdomen, and spine
- Stimulates the thyroid and pituitary glands

- Increases energy and counteracts depression



**Plate – XIII Subject performing the Chakrasana**

## **Matsyasana**

### **Procedure**

- First of all, lie down on your back on the yoga mat. Bend your knees with feet on the ground or Yoga mat.
- In the next step, breathe in along with slightly raise your pelvis off from the ground. At this time slide your hands with palms facing down under your hips.
- Next, relax your hips (Butts) on your hands. Remember that not to lift your hands throughout the process (keep your hands firmly on the ground palms facing down).
- Keep your forearms with little-lifted elbows near to the side of your mid-section (Torso). Breathe in along with push your elbows & forearms strongly against the ground or floor. Then, push your shoulder

blade to your back when you breathe in and raise your upper section (upper torso). Keep your head far from the ground/floor.

- In the next step, relax your head by placing on the ground and make an arch by your back as well as raise your chest also (making an arch of back & lifting of the chest is depend on your ability). Keep on your mind don't rest your head completely on the ground try to place your crown part on the floor.
- But keep very less amount of weight on your crown (head), for avoiding lots of pressure on your neck part.
- You may also straighten your legs or bend your knees on the ground for your comfort. But stretch your feet are outwards as shown in the image.
- Hang on in the Pose around 30 to 60 seconds (at starting point you can hold the pose for 15 to 20 seconds) with normal breathing.
- After that, breathe out along with lower down your midsections (torso) bring your head completely down to the ground.
- Next, bring your knees close to the abdomen in a way that your thigh (upper region of thighs) touches the abdomen part and squeeze. It improves the strength of your abdominal region

## Benefits

- The fish pose build your neck and upper back muscles stronger.
- Matsyasana gives calmness to your mind, decreasing the level of anxiety, stress, depression, and fatigue.
- Matsyasana is good for improving your posture.
- Stretches and tones your abdominal region.
- It also stretches the hip flexors.
- The fish pose gives relief in mild back pain. Corrects the issue related to stomach like constipation.
- It stretches and strengthens your chest, by which fish pose is best for respiratory problems.



- According to the text, the fish pose kicks out all general issues from your body.
- Lower down the pain during Menstrual in women.



**Plate – XIV Subject performing the Matsyasana**

## **Naukasana**

### **Procedure**

- Lie on your back with your feet together and arms beside your body.
- Take a deep breath in and as you exhale, lift your chest and feet off the ground, stretching your arms towards your feet.
- Your eyes, fingers and toes should be in a line.
- Feel the tension in your navel area as the abdominal muscles contract.
- Keep breathing deeply and easily while maintaining the pose.
- Hold the position for few seconds.
- As you exhale, come back to the ground slowly and relax.
- Duration 3-4 repetitions daily but should not overdo.

## Benefits

- Strengthens the back and abdominal muscles
- Tones the leg and arm muscles
- Useful for people with hernia
- This Yoga Pose helps to remove belly fat
- It improves digestion
- Helps in developing six packs ABS
- Improves the circulation of blood
- Give strength to thigh, hips, shoulder and neck
- Regulates the function of liver, pancreas and lungs
- Maintains the function of kidney, thyroid and prostate glands



**Plate – XV Subject performing the Naukasana**

## Dhanurasana

### Procedure

- Lie on your stomach
- Hold the both feet with your hands making a back bend and positioning like a bow.
- Pull your both feet slowly – slowly, as much as you can.

- Look straight ahead with a smile in your face.
- Keep the pose stable while paying attention to your breath.
- After 1-20 seconds as you exhale, gently bring your legs and chest to the ground and relax.

## Benefits

- Dhanurasana strengthens the back and the abdomen at the same time
- Keeps you active and energetic
- It helps improve upon stomach disorders
- Bow Pose also helps in reducing fat around belly area
- It is beneficial specifically to women as it improves reproductive system and helps improve menstrual disorders
- Helps regulate the pancreas and is recommended for people with diabetes
- Expands the thoracic region of the chest
- Helps alleviate hunchback
- Increases the appetite
- Bow Pose combines the benefits of the Cobra and the Locust postures
- Balancing the weight of the body on your abdomen also reduces abdominal fat and keeps the digestive and reproductive systems healthy



**Plate – XVI Subject performing the Dhanurasana**

## **Bhujangasana**

### **Procedure**

First of all you have to wear some comfortable clothes, remember don't wear tight and uncomfortable clothes while doing any asana. Setu Bandha sarvangasana etc is preparatory poses Bhujangasana.

- Start with lying down on the floor on your stomach in a comfortable level preferably on yoga mat. Keep your feet together with the tops of them against the floor.
- Now spread your hands on the floor under your shoulders and hug your elbows against your rib cage. After doing this close your eyes, and inhale slowly but deeply. Imagine the stability in your pelvis, thighs and your feet tops. Imagine, that part rooted to the ground.
- Exhale gradually before opening your eyes, continue breathing process (Inhale- exhale) slowly and deeply. As you inhale, your arm should be steadily straighten and this feels uncomfortable. Extend through and deepen your stretch to create a graceful arc in your back. Use the stretch in your legs and back, in place of exerting yourself to gain height and risk overarch the spine.

- Now press your tailbone towards your pubis and lift your pubis toward your navel, in this trying to narrowing your hips.
- Keep your shoulders broad but in relaxed, with the blades low on your back. Now lift from the top of your sternum, but try to avoid pushing the front of your ribs forward. Puff your side ribs forward and keep your lower back in relaxed, and trying to distribute the stretch evenly along your spine. In the process of up and down, inhale when your bent upwards and hold your breath for few seconds and in down position exhale. In upward position trying to hold and your breathe also for some seconds, and release your breathe while getting back to starting position or lying down position.

## Benefits

This Asana helps to stretches muscles in the shoulders, chest and abdominal also. It decreases stiffness of the lower back, and it give strengthens the arms and shoulders.

- It increases flexibility, improves menstrual irregularities in women. Elevate mood, and this can also help in stress, depression, anxiety keep away from our mind. It firms and tones the butt area.
- Improves the blood circulation and oxygen in body, heart and throughout the spinal and pelvic region especially, and it's stimulates organs in the abdomen, like kidneys. It also opens the chest and helps to clear the passages of the heart and lungs.
- Improves digestion, Gives strengthens to the spinal cord. Help to soothes sciatica. It also helps to cure the symptoms of asthma.



**Plate – XVII Subject performing the Bhujangasana**

## **Rajakapotasana**

### **Procedure**

- Begin off on your fours, ensuring your knees are set directly under your hips and your hands somewhat in front of your shoulders.
- After that tenderly slide your right knee forward, with the end goal that it is simply behind your right wrist, during this, keep your right shin under your torso, and acquire your right foot front of your left knee. The exterior of your right shin must lie on the floor.
- Gradually, slide your left leg to the back. Rectify your knee, and drop the front of your thighs to the floor. Bring down the exterior of your right backside on the floor. Place your right heels before your left hip.
- You can also point your right knee towards the right, to such an extent that it is outside the line of the hip.
- Your left leg ought to broaden itself straight out of the hip. Ensure it is not turned or bent to your left side. Now rotate it inwards, with the end goal that its midline is squeezed against the floor.
- After that, take a long and deep breath; while you breathe out bend left leg from the knees. At that point, push your middle back and extend as much as you can so that your head touches your foot.



- Raise your arms, tenderly collapsing them at your elbows. Utilize your hands to bring your foot towards your head.
- Keep up the upright position of your pelvis. Push it down. At that point, lift the lower edges of your rib confine against the weight of the push.
- For lifting up your mid-section (Chest), push the highest point of your sternum straight up and towards the roof.
- Remain in this position around 30 to 60 seconds.
- Now put down your hands back to the floor and put your left knee down. Slowly slide your left knee forward.
- Breathe out and get into the Adho Mukha Svanasana.
- Rest for some time returned on your fours and relax. As you breathe out, do the asana with your left leg forward and right leg at the back.
- Repeat this process with your right leg forward and once with your left leg forward.

### Benefits

- Rajakapotasana stretches your entire lower body.
- It massages your abdominal organs, thereby improving digestion.
- Strengthens your back and it relieves in back problems like sciatica.
- King Pigeon pose opens up your hips and makes your hips more flexible.
- The profound stretch calms the body of anxiety and tension.
- It opens up the mid-section (chest) and reinforces the crotch.
- King pigeon pose likewise enhances the working of the urinary and regenerative frameworks (reproductive systems).





**Plate – XVIII Subject performing the Rajakapotasana**

### **Shalabhasana**

### **Procedure**

- Lie down on your Stomach; place both hands underneath the thighs.
- Breath in (inhale) and lift your right leg up, (your leg should not bend at the knee).
- Your chin should rest on the ground.
- Hold this position about ten to twenty seconds.
- After that exhale and take down your leg in the initial position
- Similarly do it with your left leg.
- Repeat this for five to seven times.
- After doing it with the left leg, inhale and lift your both legs up (Your legs should not bend at the knees; lift your legs as much as you can).
- With both legs repeat the process for two to four times.

### **Benefits**

- It is beneficial in all the disorders at the lower end of the spine
- Most helpful for backache and sciatica pain
- Useful for removing unwanted fats around abdomen, waist, hips and thighs
- Daily practice of this Asana can cures cervical spondylitis and spinal cord ailments
- Strengthening your wrists, hips, thighs, legs, buttocks, lower abdomen and diaphragm
- Toughens back muscle



**Plate – XVIII Subject performing the Shalabhasana**

## **Makarasana**

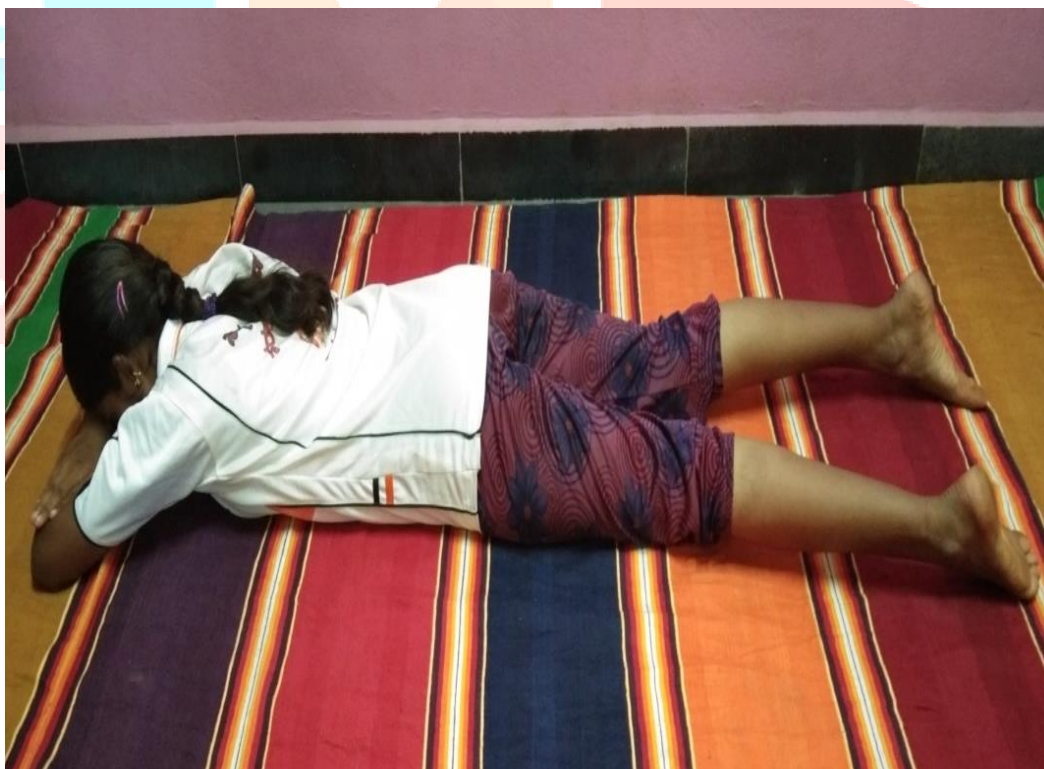
### **Procedure**

- Lie down straight on your stomach.
- Now join your elbows, making a stand and place your palms under the chin.
- Lift your chest up.
- Keep your elbows and legs together.

- During inhaling, first fold your one leg at a time and then both the legs together.
- During folding, your ankles should touch the hips.
- While exhaling, your feet should be straight and keep your head steady.
- Repeat this for 20 to 25 times.

## Benefits

- Beneficial in cervical, slip disc, spondylitis, sciatica
- Beneficial in all spine related problems.
- Very useful in Asthma, knee pain, and other lungs related problems
- Stretches the muscles of legs and hips
- This pose is best for relaxing after doing other Asana



**Plate – XIX Subject performing the Makarasana**

## Stress

Questionnaire development by Dr. (Mrs.) Vijaya Lakshmi and Dr. Shruti Narain

### Procedure

Originally, 67 items were written and submitted to a group of language experts who made necessary corrections and modifications. Subsequently, they were submitted to a group of experts (college teachers) of psychology for expressing their judgments about the suitability of the contents of the items. Out of the 67 items, 54 reached common consensus. Then the scale was administered on 300 adolescents and scores were obtained. The response was to be given in either 'Yes' or 'No'. A score of +1 and 0 was given. The answers of those items which tallied with the answers given in the scoring key were given a score of +1. If they didn't tally, they were given a score of zero. The response of the subjects on each item was obtained. Following it, item analysis was done by using Point-biserial correlation (Singh, 2013). Out of the 54 items, only 40 items were found significant, some at .01 and others at .05 levels. Finally a set of those 40 items were retained for stress scale for Adolescents. Items were divided for each dimension.

This scale is meant for Adolescents in the age range of 12 to 24 years. The scale can be administered either by self or by the investigator. It may be used in group as well as individual condition. There is no fixed time limit as such. However it generally takes about 10 to 15 minutes in its completion. For smooth administration of stress scale clear instructions are printed at the top of first page.

### Scoring

The answers of those items which tally with the answers given in the scoring key are given a score of +1. If they did not tally, they are given a score of zero. Positive items are given a score of +1 on 'Yes' and zero on 'No' and negative items are given +1 on 'No' and Zero on 'Yes'. Higher the score, greater is the level of stress.

Item	Yes	No
Positive	1	0
Negative	0	1





**Plate – XX Subject responding, the response to the Stress Questionnaire**

### **Self- confidence**

Student self-confidence scale developed by M.Basavanna

### **Procedure**

The 100 items along with the directions were reprinted. Since the items as scored in the provisional form were found to be discriminative, the same scoring procedure was retained for the items included in the final.

### **Scoring**

According to the scoring key; the scores vary between 0 to 100 and here again lower the score higher would be the level of self-confidence and vice –versa.



### Plate-XXI Subject responding, the response to the Self- confidence Questionnaire

#### Resting pulse rate (Radial Pulse rate)

#### Purpose

To assess the pulse rate of the subject at the resting conditions

**Equipment:** Stop watch.

#### Procedure of the test

Resting pulse rate for each subject was recorded in the morning time just after getting up from the bed and before going to the playground. Five minutes before taking the pulse the subject was asked to lie down in a supine position and rest on the bed or floor. The investigator used the stop watch and determined the pulse on the wrist by placing two or three fingers over brachial artery in the fore arm and the side of the thumb.

#### Scoring

Total number of heart beats per minute was recorded for each subject as score. (Baumgartner, T. and A. Jackson, 1987)



**Plate – XXI Subject performing the Resting pulse rate**

## **Blood Pressure**

### **Objective**

To find out the systolic and diastolic blood pressure.

### **Equipment**

Sphygmomanometer and a stethoscope

### **Procedure**

The rubber cuff is placed around the upper arm so it surrounds the brachial artery. Air is pumped into the cuff so that the pressure around the arm exceeds arterial pressure. Since the pressure is applied around the arm in greater than arterial pressure, the brachial artery is squeezed shut and the blood flow is stopped. If a stethoscope is placed over the brachial artery (just below the cuff, no sound is heard since there is no blood flow. However when, the air control valve is slowly opened to release air, the pressure in the cuff begins to decline and soon the pressure around the arm reaches a point that is equal to or just slightly below arterial pressure. At this point blood begins to spurt through the artery and a sharp sound can be heard through the stethoscope. The pressure (ie) height of mercury column at which the first tapping sound is heard, represents



systolic blood pressure. As the cuff pressure continues to decline, a series of increasingly louder sounds can be heard when the pressure in the cuff is equal to or slightly less diastolic blood pressure. The sound heard through the stethoscope is ceased. Therefore, diastolic blood pressure represents the height of the mercury column when the sound becomes abruptly muffled (Prentice, 1994).

## Scoring

Blood pressure is recorded in the units of millimeters of mercury (mm Hg). Normal blood pressure is usually considered to be 120 for systolic and 80 for diastolic pressure - the women. Medical treatment should be sought if measurements in the high category are recorded consistently.



Plate – XXII Subject performing the Blood Pressure

## Vo2 Max - Harvard Step Test

The Harvard Step test is a test of aerobic fitness, developed by Brouha et al. (1943) in the Harvard Fatigue Laboratories during WWII. The features of this test are that it is simple to conduct and requires minimal equipment. There are many other variations of step tests too.

**Equipment required:** Step or platform 20 inches / 50.8 cm high, stopwatch, metronome or cadence tape

**Procedure:** The athlete steps up and down on the platform at a rate of 30 steps per minute (every two seconds) for 5 minutes or until exhaustion. Exhaustion is defined as when the athlete cannot maintain the stepping rate for 15 seconds. The athlete immediately sits down on completion of the test, and the total numbers of heart beats are counted between 1 to 1.5 minutes after finishing (see measuring heart rate). This is the only measure required if using the short form of the test. If the long form of the test is being conducted, there is an additional heart rate measures at between 2 to 2.5 minutes, and between 3 to 3.5 minutes. See some videos of Harvard Step tests being performed.

**Scoring:** The Fitness Index score is determined by the following equations. For example, if the total test time was 300 seconds (if completed the whole 5 minutes), and the number of heart beats between 1-1.5 minutes was 90, between 2-2.5 it was 80 and between 3-3.5 it was 70, then the long form Fitness Index score would be:  $(100 \times 300) / (240 \times 2) = 62.5$ . Note: you are using the total number of heart beats in the 30 second period, not the rate (beats per minute) during that time.



**Plate – XXIII Subject performing the Harvard Step**

## Data Transformation

**Variables, which derived by using certain formula**

### 1. Body Mass Index :

Body Mass Index (BMI) was obtained using the following formula.

$$\text{BMI} = W \div H \text{ in meter}^2$$

## Statistical techniques

In this section the statistical techniques used to test the hypotheses are presented. The data were gathered from two groups on Physiological and Psychological variables to find out the improvement in the Physiological and Psychological variables by giving 16 weeks of Yogasana training the statistical procedures which was used to find out the significant development of Physiological and Psychological variables performance between the two groups.

Each of the selected two groups were n=70 each in group. (High school Girls), The (ANCOVA) statistical procedure was adopted step wise to find out the results. Further graphical presentation was also made for ready reference comparison and mean values were highlighted of each parameter with respect to pre and post-test.

SPSS statistics package (version 21.0) was used to test each of the hypotheses. For the statistical analyses, the level of significance was set at 0.05.

## CHAPTER-IV

### ANALYSIS AND INTERPRETATION OF DATA

In this chapter, the results of the statistical analyses of the data are presented in relation to the Hypothesis stated in the earlier chapter. For convenience, the presentation is in two different subsections as was done in earlier chapters namely, Physiological Variable and Psychological Variables. The Hypothesis developed earlier is stated in the appropriate sections. Details of the analyses are provided wherever it was deemed to be necessary. The aim of the research work was to find out the **“Effects of Yogasana on Physiological and Psychological Variables of High School Girls”**. For the purpose of the research study 140 high school girls in the age group of 13 to 16 years belonging to the student of Government High school of Jamakhandi District of Karnataka state were selected as subjects for the present study. The subjects were divided into two groups. Group I treated as Experiment (Yogasana training group) and Group II considered as control group.

Yogasana group underwent Yogasana training for Twelve weeks. The duration of the training session allowed to the experimental groups Twelve weeks. The Control group did not participate in the training programme rather than their routine work. Detailed general description including mean standard deviation of Experimental and Controlled group, (ANALYSES OF COVARIANCE (ANCOVA) table with bar chart presented in the chapter.

### Hypothesis I

The first Hypothesis of this section, **It was hypothesized that the Yogasana training develops Resting pulse rate.**

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of Resting pulse rate was presented in the following tables no 6.

**Table No 6. Descriptive table of Resting Pulse Rate of Experiment and Controlled Group**

Group	Pre – Test		Post Test		Adjusted Post Test	
	MEAN	SD	MEAN	SD	MEAN	SD
Experiment Group	92.12	5.05	41.85	30.10	41.84	3.77
Control	89.08	14.50	92.85	5.48	92.72	1.70

From the above table no 6 we can observe that, experimental group Pre-Test mean of Resting Pulse Rate is greater than the control group mean resting pulse rate, further in Post-test mean we can observed that experimental group mean was reduced compare to control group resting pulse rate. It was noticed that in post-test of resting pulse rate control group mean was increased compare to experimental group mean. To find out the significant difference between in Pre and Post-test between experimental and control group in resting pulse rate the data was subjected to ANCOVA. The analyses of covariance performance of resting pulse rate is demonstrated in the table no 7.

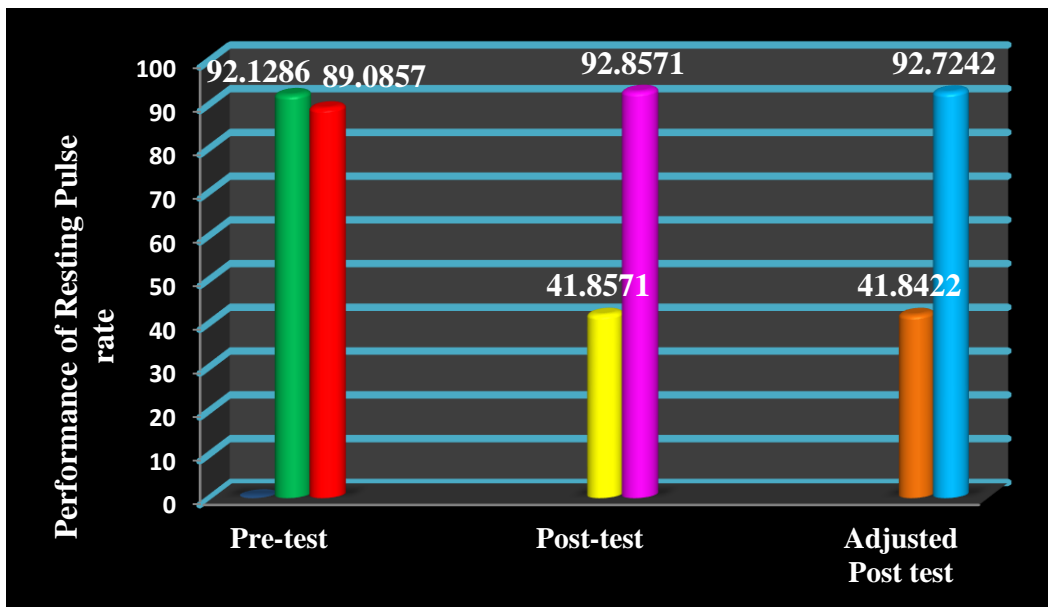
**Table No 7. Analyses of Covariance performance of Resting Pulse rate**

	Source	Sum of Square	Df	Mean Square	F- Value
<b>Pre- Test</b>	Between	42.62	17	2.50	1.761
	Within	74.02	52	1.42	
<b>Post-Test</b>	Between	645.96	17	37.99	<b>7.075*</b>
	Within	543.81	52	10.45	
<b>Adjusted Post Test</b>	Between	544.72	17	32.04	<b>5.509*</b>
	Within	296.62	52	5.81	

**\*The level of significant is 0.05= table value 4.03.**

The F ratio is 1.761 this reveals that there is no statistical difference between the Experimental group and control group on resting pulse rate before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test resting pulse rate performance is lesser than the pre-test resting pulse rate performance. Hence we conclude that statistically there is significant difference between the Experimental group and control group on mean resting pulse rate. By observing descriptive table of Resting pulse rate, we can conclude that, Due to 12 week Yogasana training significant change was observed in Resting pulse rate reduced of experimental group. Hence the first Hypothesis which stated that, **that the Yogasana training develops Resting pulse rate was accepted.** The graphical representation of resting pulse rate performance has been displayed figure no 1.



**Figure 1 Pre-test, Post-test and adjusted Post-test Performance of Resting Pulse rate**

The above figure no 1 indicated that the post test values of Experimental group and adjusted post-test significantly improved the performance of resting pulse rate and also the post-test values of resting pulse rate were lesser than the pre-test values due 16 weeks of Yogasana training. The control group pre-test and post-test performance of resting pulse rate shows no improvement.

## Hypothesis II

The second Hypothesis of this section, it was hypothesized that the Yogasana training improves the Systolic Blood Pressure level.

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of systolic blood pressure was presented in the following tables no 8.

**Table No 8. Descriptive table of Systolic Blood Pressure of Experiment and Controlled Group**

Group	Pre – Test		Post Test		Adjusted Post Test	
	MEAN	SD	MEAN	SD	MEAN	SD
Experiment Group	121.00	1.85	116.30	3.72	115.67	3.81
Control	118.72	4.24	117.97	5.32	118.59	3.41

From the above descriptive table number 8, we can observe that, in Pre-test experimental group systolic blood pressure level is greater than the control group. In Post-test experimental group's systolic blood pressure was

reduced and control groups systolic blood pressure was also reduced. To test to find out the exact difference between experimental and control group in pre and post-test the data was subjected to ANCOVA. The detailed presentation of ANCOVA test is presented in the table number 9.

**Table No 9 Analysis of Covariance of Systolic Blood Pressure.**

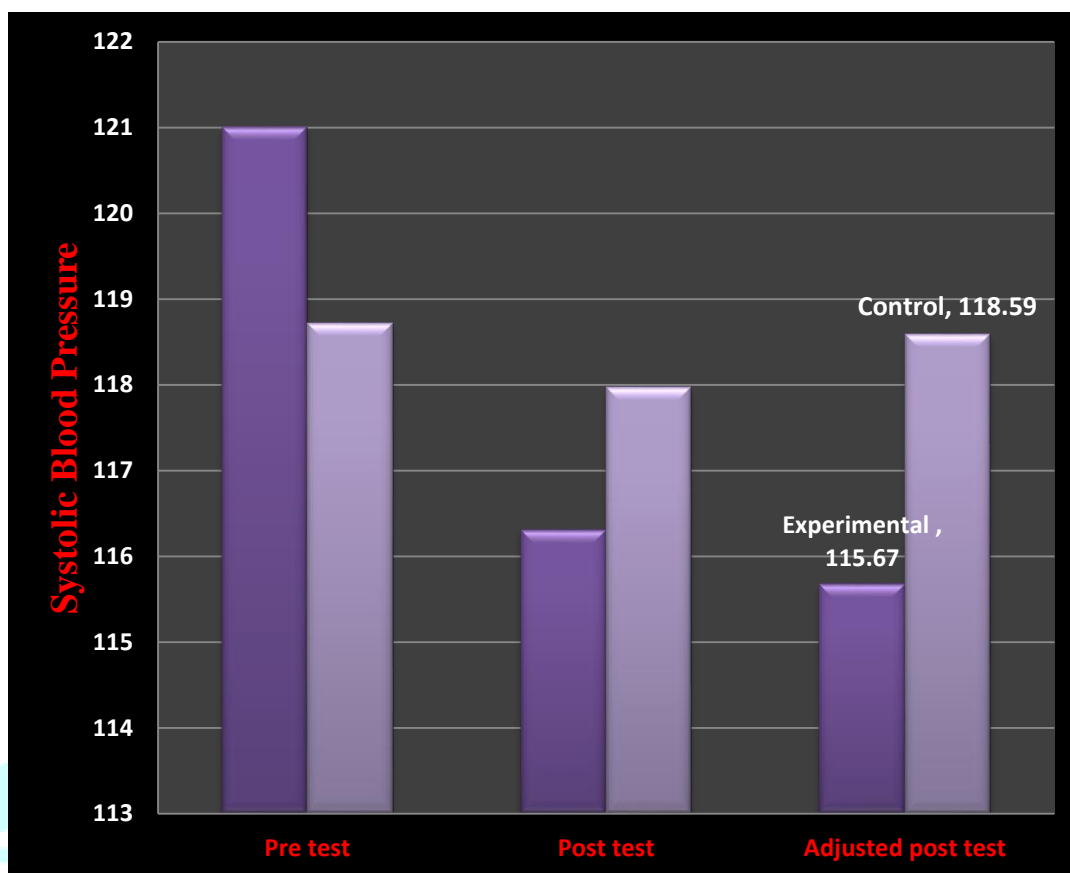
Test	Source	Sum of Square	Df	Mean Square	F- Value
<b>Pre- Test</b>	Between	61.274	17	3.60	2.769
	Within	67.824	52	1.30	
<b>Post-Test</b>	Between	943.264	17	55.48	<b>4.485*</b>
	Within	643.284	52	12.37	
<b>Adjusted Post Test</b>	Between	1062.284	17	62.48	<b>4.170*</b>
	Within	778.964	52	14.98	

**\*The level of significant is 0.05= table value 4.03.**

The F ratio is 2.769 reveals that there is no statistical difference between the Experimental group and control group on systolic blood pressure before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test systolic blood pressure performance is lesser than the pre-test resting pulse rate performance. Hence we conclude that statistically there is significant difference between the Experimental group and control group on mean systolic blood pressure. By observing descriptive table of systolic blood pressure we can conclude that, Due to 12 week Yogasana training significant change was observed in systolic blood pressure reduced of experimental group. Hence, the second Hypothesis which stated that **the Yogasana training improves the Systolic Blood Pressure level, hence the hypothesis was accepted.** The graphical representation of systolic blood pressure has been displayed in the figure no 2.





**Figure 2 Pre-test, Post-test and adjusted Post-test of systolic Blood Pressure**

The above figure 2 indicate that the post test values of Experimental group and adjusted post-test significantly improved the performance of systolic Blood Pressure and also the post-test values of systolic Blood Pressure were less than the pre-test values due 12 weeks of Yogasana training. The control group pre-test and post-test performance of systolic Blood Pressure shows no improvement.

### Hypothesis III

The Third Hypothesis of this section, **it was hypothesized that the Yogasana training improves the diastolic Blood Pressure level.**

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of diastolic blood pressure was presented in the following tables no 10.

**Table No 10. Descriptive table of Diastolic Blood Pressure of Experiment and Controlled Group**

Group	Pre – Test		Post Test		Adjusted Post Test	
	MEAN	SD	MEAN	SD	MEAN	SD

Experiment Group	84.08	4.91	75.37	3.37	75.39	3.14
Control	82.54	4.68	80.22	3.74	80.20	4.28

From the above descriptive table number 10, we can observe that, in Pre-test experimental group diastolic blood pressure level is greater than the control group. In Post-test experimental group's diastolic blood pressure was reduced and control groups systolic blood pressure was also increased. To find out the exact difference between experimental and control group in pre and post-test the data was subjected to ANCOVA. The detailed presentation of ANCOVA test is presented in the table number 11.

**Table No 11 Analysis of Covariance of Diastolic Blood Pressure.**

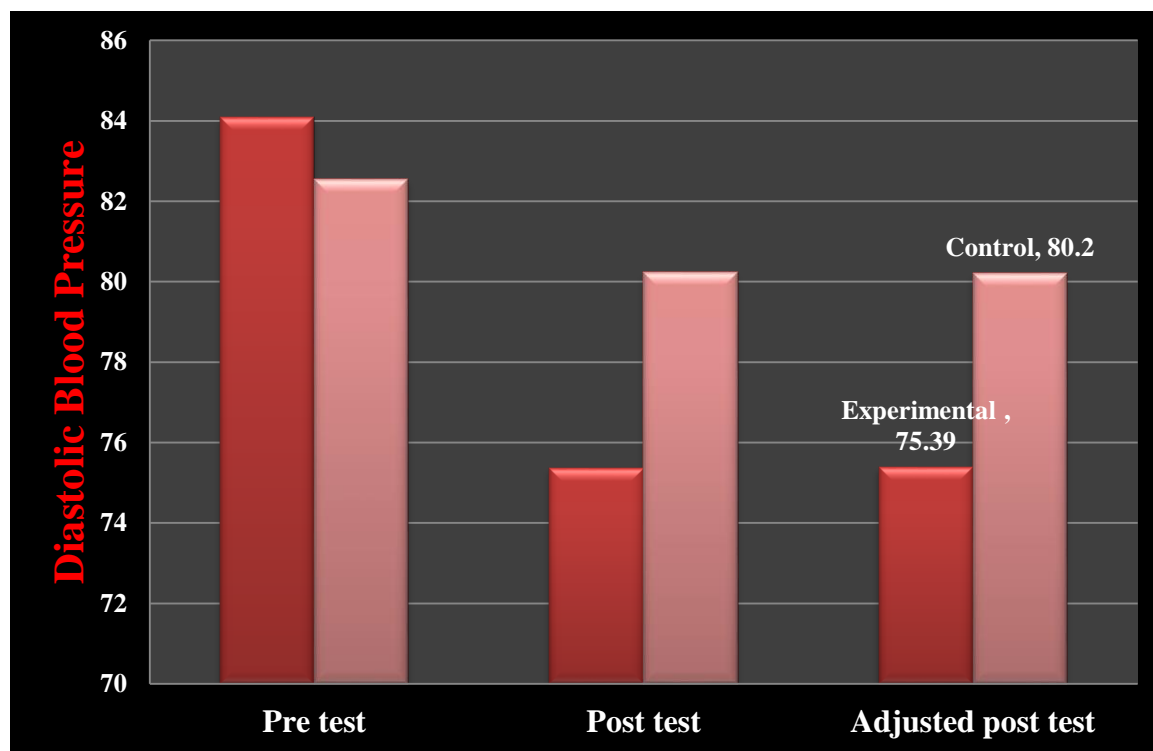
Test	Source	Sum of Square	Df	Mean Square	F- Value
<b>Pre- Test</b>	Between	55.654	17	3.274	2.425
	Within	70.127	52	1.348	
<b>Post-Test</b>	Between	887.21	17	52.18	<b>4.440*</b>
	Within	611.21	52	11.75	
<b>Adjusted Post Test</b>	Between	968.18	17	56.95	<b>4.541*</b>
	Within	652.12	52	12.54	

**\*The level of significant is 0.05= table value 4.03.**

The F ratio is 2.425 reveals that there is NO statistical difference between the Experimental group and control group on systolic blood pressure before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test systolic blood pressure performance is lesser than the pre-test systolic blood pressure. Hence we conclude that statistically there is significant difference between the Experimental group and control group on mean diastolic blood pressure. By observing descriptive table of diastolic blood pressure we can conclude that, Due to 12 week Yogasana training significant change was observed in diastolic blood pressure reduced of experimental group. Hence the third Hypothesis which stated that, **that the Yogasana**

training improves the diastolic Blood Pressure level hence the hypothesis was accepted. The graphical representation of systolic blood pressure has been displayed in the figure no 3.



**Figure 3 Pre-test, Post-test and adjusted Post-test Performance of diastolic Blood Pressure**

The above figure 3 indicate that the post test values of Experimental group and adjusted post-test significantly improved the performance of diastolic Blood Pressure and also the post-test values of systolic Blood Pressure were less than the pre-test values due 12 weeks of Yogasana training. The control group pre-test and post-test performance of diastolic Blood Pressure shows no improvement.

#### **Hypothesis IV**

The Fourth Hypothesis of this section, **It was hypothesized that the Yogasana training develops Vo<sup>2</sup> Max.**

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of Vo<sub>2</sub> max rate was presented in the following tables no 12

**Table No 12. Descriptive table of VO<sub>2</sub> Max of Experiment and Controlled Group**

Group	Pre – Test		Post Test		Adjusted Post Test	
	MEAN	SD	MEAN	SD	MEAN	SD
Experiment Group	27.45	2.13	38.28	13.55	38.24	2.80
Control	26.72	3.18	25.84	5.27	25.84	3.00

From the above descriptive table number 12, we can observe that, in Pre-test experimental group VO<sub>2</sub> max is greater than the control group. In Post-test experimental group's VO<sub>2</sub> max was increased compare to control groups. To find out the exact difference between experimental and control group in pre and post-test the data was subjected to ANCOVA. The detailed presentation of ANCOVA test is presented in the table number 13.

**Table No 13 Analysis of Covariance Performance of VO<sub>2</sub> Max.**

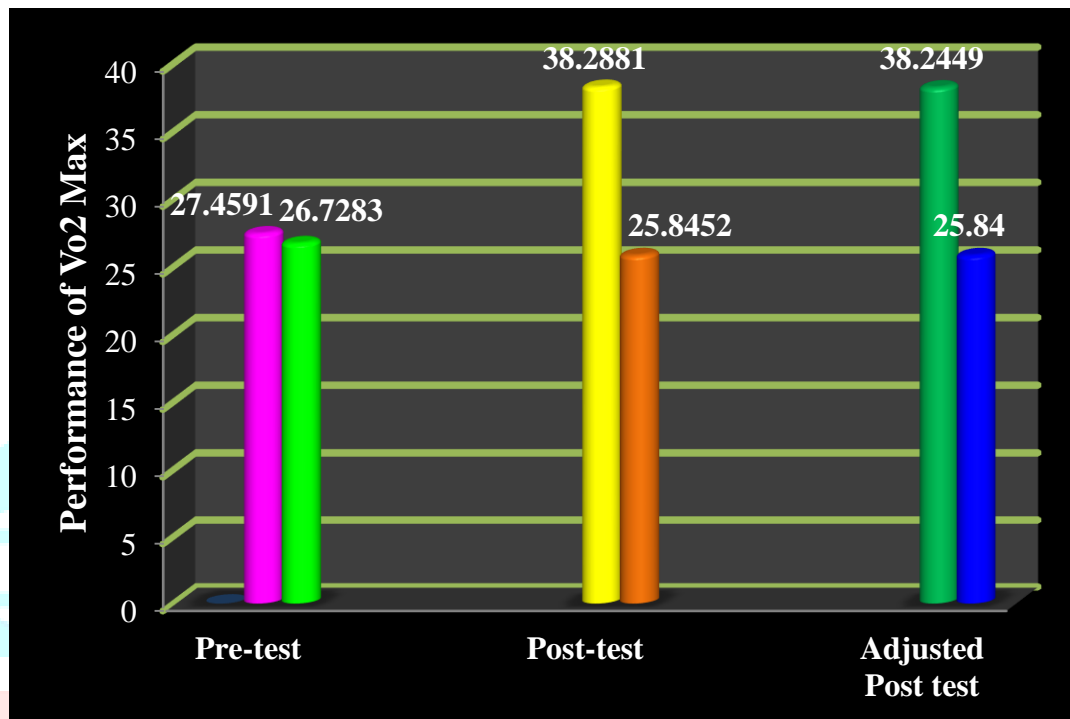
Test	Source	Sum of Square	Df	Mean Square	F- Value
<b>Pre- Test</b>	Between	43.414	17	2.553	<b>1.893</b>
	Within	70.127	52	1.348	
<b>Post-Test</b>	Between	206.424	17	2.142	<b>15.532*</b>
	Within	40.652	52	0.781	
<b>Adjusted Post Test</b>	Between	236.114	7	13.889	<b>16.814*</b>
	Within	42.128	51	0.826	

**\*The level of significant is 0.05= table value 4.03.**

The F ratio is 1.893 reveals that there is NO statistical difference between the Experimental group and control group on Vo<sub>2</sub> Max before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test V<sub>02</sub> max performance is lesser than the pre-test vo<sub>2</sub> max. Hence we conclude that statistically there is significant difference between the Experimental group and control group on mean vo<sub>2</sub> max capacity. By observing descriptive table of v<sub>02</sub> max we can conclude that, Due to 12 week Yogasana

training significant change was observed in vo2 max capacity increased of experimental group. Hence the fourth Hypothesis which stated that, **that the Yogasana training improves the V02 Max**, was accepted. The graphical representation of Vo2 max capacity has been displayed in the figure no 4.



**Figure 4 Pre-test, Post-test and adjusted Post-test Performance of Vo2 max**

The above figure 4 indicate that the post test values of Experimental group and adjusted post-test significantly improved the performance of Vo2 max and also the post-test values of Vo2 max were higher than the pre-test values due 12 weeks of Yogasana training. The control group pre-test and post-test performance of Vo2 max shows no improvement.

### Hypothesis V

The fifth Hypothesis of this section, **it was hypothesized that the Yogasana training reduces the overall BMI level.**

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of BMI was presented in the following tables no 14.

**Table No 14. Descriptive table of BMI of Experiment and Controlled Group**

Group	Pre – Test		Post Test		Adjusted Post Test	
	MEAN	SD	MEAN	SD	MEAN	SD
Experiment Group	17.33	1.44	16.95	1.35	17.76	2.17
Control	18.98	4.32	20.19	4.45	19.38	4.21

From the above descriptive table number 14, we can observe that, in Pre-test experimental group BMI was less than the control group. In Post-test experimental group's BMI of experimental group reduced and control groups BMI remained increased. To find out the exact difference between experimental and control group in pre and post-test the data was subjected to ANCOVA. The detailed presentation of ANCOVA test is presented in the table number 19.

**Table No 15 Analysis of Covariance of BMI of experimental and control group.**

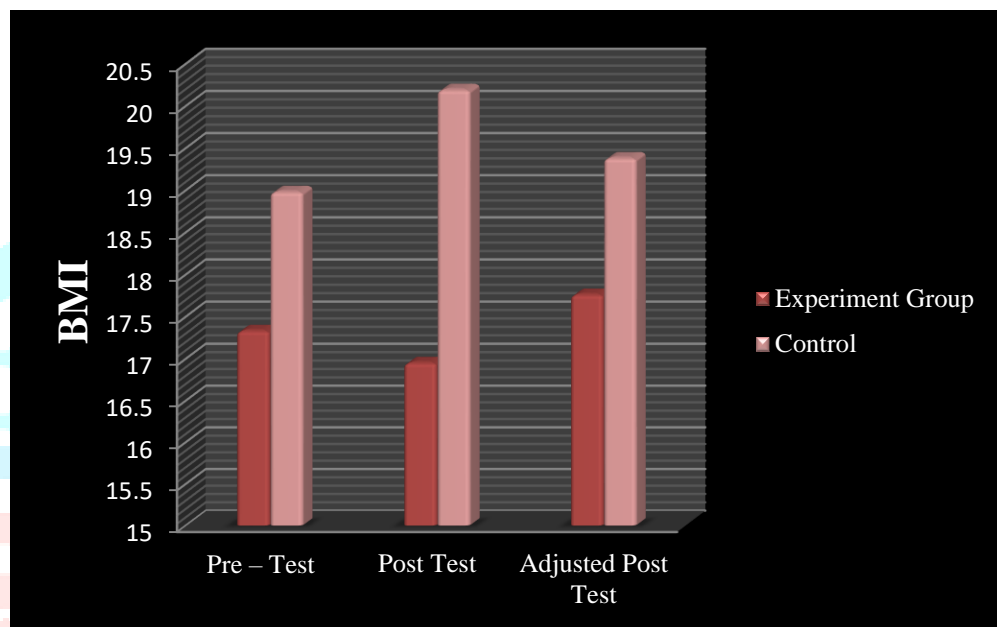
	Source	Sum of Square	Df	Mean Square	F- Value
<b>Pre- Test</b>	Between	54.261	17	3.191	2.410
	Within	68.886	52	1.324	
<b>Post-Test</b>	Between	967.25	17	56.89	4.848*
	Within	610.28	52	11.73	
<b>Adjusted Post Test</b>	Between	952.63	17	56.95	4.869*
	Within	598.44	52	11.50	

\*The level of significant is 0.05= table value 4.03.

The F ratio is 2.410 reveals that there is no statistical difference between the Experimental group and control group on BMI Level before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test is greater than the pre-test of BMI. Hence we conclude that statistically there is

significant difference between the Experimental group and control group on mean in BMI. By observing descriptive table of BMI we can conclude that, Due to 12 week Yogasana training significant change was observed in BMI level improvement of experimental group. Hence the fifth Hypothesis which stated, **that the Yogasana training improves the overall BMI level. Hence the hypothesis was accepted.** The graphical representation of systolic blood pressure has been displayed in the figure no 5.



**Figure 5: Pre-test, Post-test and adjusted Post-test Performance of BMI**

The above figure 5 indicate that the post test values of Experimental group and adjusted post-test significantly improved the performance of BMI and also the post-test values of BMI were higher than the pre-test values due 12 weeks of Yogasana training. The control group pre-test and post-test performance of BMI shows no improvement.

## Hypothesis VI

The Sixth Hypothesis of this section, **it was hypothesized that the Yogasana training reduces the stress**

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of stress was presented in the following tables no 16.

**Table No 16. Descriptive table of Stress of Experiment and Controlled Group**

Group	Pre – Test	Post Test	Adjusted Post Test
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	MEAN	SD	MEAN	SD	MEAN	SD
Experiment Group	32.32	8.15	19.77	7.50	19.83	0.43
Control	32.04	7.49	32.61	8.41	32.62	7.74

From the above descriptive table number 16, we can observe that, in Pre-test experimental group stress is marginally greater than the control group. In Post-test experimental group's stress was reduced and control groups stress remained same. To find out the exact difference between experimental and control group in pre and post-test the data was subjected to ANCOVA. The detailed presentation of ANCOVA test is presented in the table number 17.

**Table No 17 Analysis of Covariance Performance of stress**

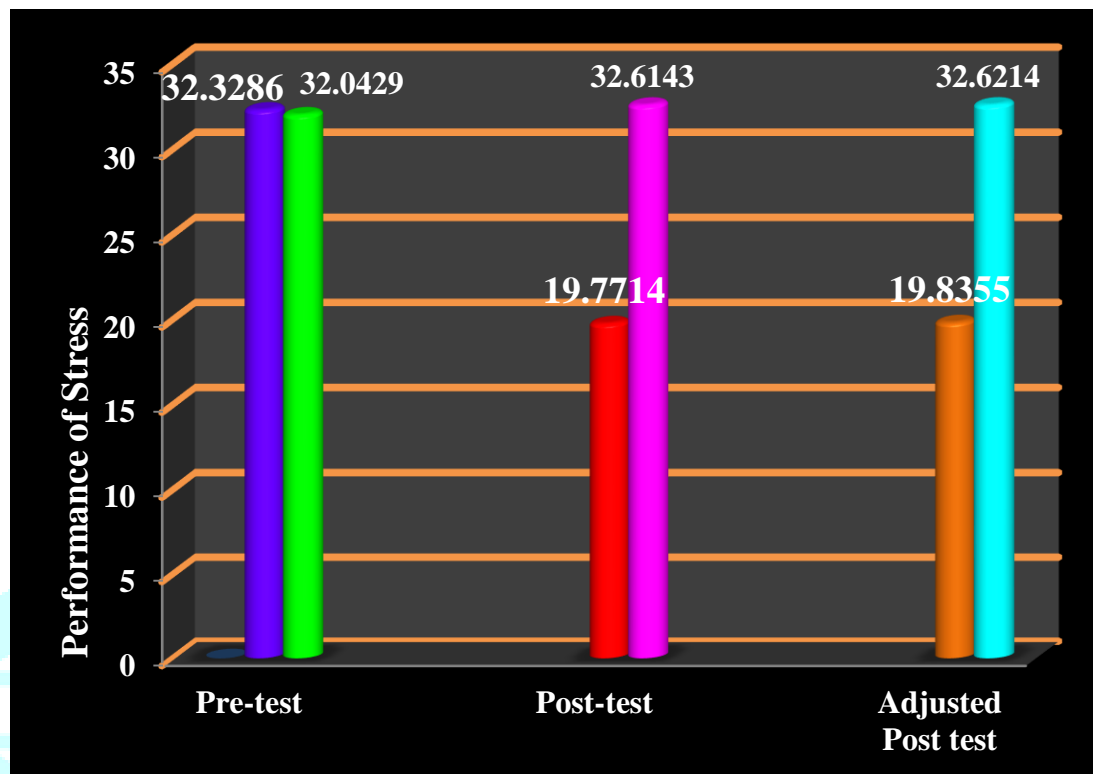
	Source	Sum of Square	Df	Mean Square	F- Value
<b>Pre- Test</b>	Between	43.4462	17	2.5556	1.9082
	Within	69.6421	52	1.3392	
<b>Post-Test</b>	Between	224.462	17	13.203	<b>12.2068*</b>
	Within	56.2462	52	1.0816	
<b>Adjusted Post Test</b>	Between	246.428	17	14.495	<b>15.1934*</b>
	Within	48.6581	51	0.9540	

**\*The level of significant is 0.05= table value 4.03.**

The F ratio is 1.9082 reveals that there is NO statistical difference between the Experimental group and control group on stress before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test stress is lesser than the pre-test stress. Hence we conclude that statistically there is significant difference between the Experimental group and control group on mean stress. By observing descriptive table of stress we can conclude that, Due to 12 week Yogasana training significant change was observed in stress reduction of experimental group. Hence the sixth Hypothesis which stated that, **that the**

Yogasana training reduces the stress level. Hence the hypothesis was accepted. The graphical representation of systolic blood pressure has been displayed in the figure no 6.



**Figure 6 Pre-test, Post-test and adjusted Post-test Performance of Stress**

The above figure 6 indicated that the post test values of Experimental group and adjusted post-test significantly improved the performance of Stress and also the post-test values of Stress were less than the pre-test values due 12 weeks of Yogasana training. The control group pre-test and post-test performance of Stress shows no improvement.

### Hypothesis VII

The Seventh Hypothesis of this section, **it was hypothesized that the Yogasana training improves the self-confidence.**

In order to test this Hypothesis the data was subjected to ANCOVA, Descriptive table of self-confidence was presented in the following tables no 18.

**Table No 18. Descriptive table of Self-confidence of Experiment and Controlled Group**

Group	Pre – Test	Post Test	Adjusted Post Test
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	MEAN	SD	MEAN	SD	MEAN	SD
Experiment Group	40.94	8.56	53.21	9.15	53.16	1.38
Control	41.74	7.95	41.22	8.18	31.25	7.03

From the above descriptive table number 18, we can observe that, in Pre-test experimental group self-confidence was less than the control group. In Post-test experimental group's self-confidence of experimental group increased and control group self-confidence remained same. To find out the exact difference between experimental and control group in pre and post-test the data was subjected to ANCOVA. The detailed presentation of ANCOVA test is presented in the table number 19.

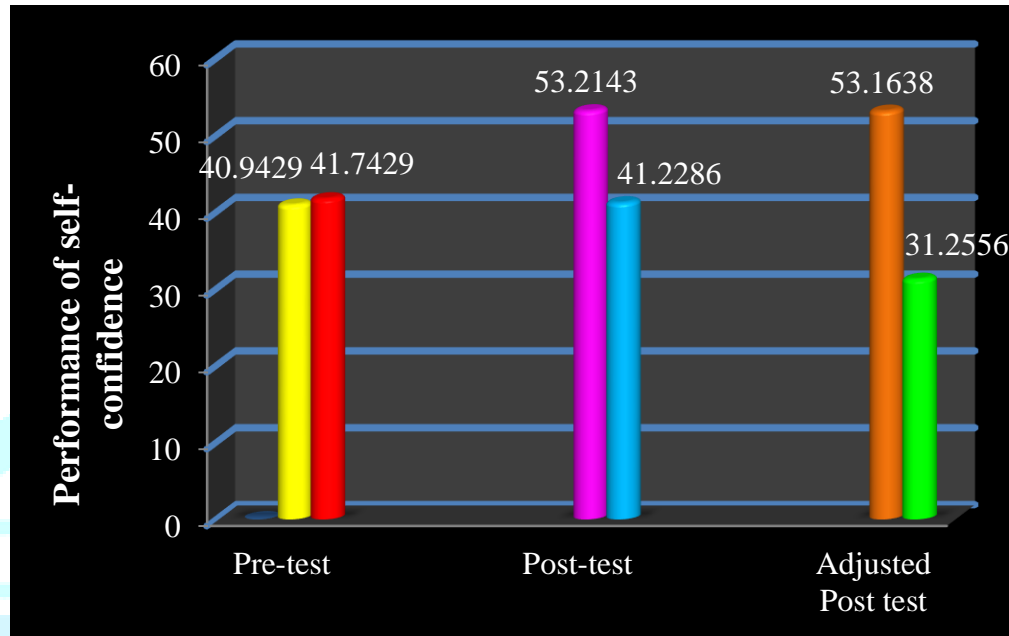
**Table No 19 Analysis of Covariance Performance of self-confidence**

Test	Source	Sum of Square	Df	Mean Square	F- Value
Pre- Test	Between	41.6423	17	2.4495	1.8529
	Within	68.7421	52	1.3219	
Post-Test	Between	361.6614	17	21.27420	7.6575*
	Within	44.4656	52	2.778184	
Adjusted Post Test	Between	391.4501	17	23.02647	27.6687*
	Within	42.44321	51	0.832219	
*The level of significant is 0.05= table value 4.03.					

The F ratio is 1.8529 reveals that there is NO statistical difference between the Experimental group and control group on self-confidence before the commencement of Yogasana training. It is inferred that the random selection of the subjects for the two groups are successful.

When we observed F-Ratio of post- test and adjusted post-test we can find out that F-Value are greater than the table value 4.03. The post-test self-confidence is greater than the pre-test self-confidence. Hence we conclude that statistically there is significant difference between the Experimental group and control group on mean sin self-confidence. By observing descriptive table of self-confidence we can conclude that, Due to 12 week

Yogasana training significant change was observed in self-confidence improvement of experimental group. Hence the seventh Hypothesis which stated that, **that the Yogasana training improves the self-confidence level. Hence the hypothesis was accepted.** The graphical representation of systolic blood pressure has been displayed in the figure no 7.



**Figure 7 Pre-test, Post-test and adjusted Post-test Performance of Self-confidence**

The above figure 7 indicate that the post test values of Experimental group and adjusted post-test significantly improved the performance of Self-confidence and also the post-test values of Self-confidence were higher than the pre- test values due 12 weeks of Yogasana training. The control group pre-test and post-test performance of Self-confidence shows no improvement.

### Discussion on findings

The purpose of the study was to investigate the effect of the Yogasana training on high school girls. The result of the study indicates tremendous improvement on Resting pulse rate, Blood Pressure,  $Vo_2$  max, Stress, Self-confidence and Body Mass Index (BMI)

The result of the Yogasana training indicates significant improvement on the Resting pulse rate of the subjects. The result of the study is justified with following studies. The result of the present study was also supported by

**Kewal Krishan and Sudhir Kumar Sharma (2009), Ramesh V, Sakthignanavel D and Subramaniam P.K. (2010), and Saroja, (2011)**

The result of the Yogasana training indicates significant improvement on the Blood Pressure of the subjects. The result of the study is justified with following studies. The result of the present study was also supported by **Shanthameena, (2007), Ramesh V, Sakthignanavel D and Subramaniam P.K. (2010) and Viajaykumari and Esther Ravi (2012).**

The result of the Yogasana training indicates significant improvement on the  $Vo^2$  max of the subjects. The result of the study is justified with following studies. The result of the present study was also supported by **Telles S, Reddy S.K. and Nagendra H.R. et al. (2000), Amutha, (2010) and Ray (2001).**

The result of the Yogasana training indicates significant improvement on the Stress of the subjects. The result of the study is justified with following studies. The result of the present study was also supported by **Brown R.P. and Gerbang P.L. (2009), Shenbagavalli & Divya.8 (2010) and Adhikari (2008).**

The result of the Yogasana training indicates significant improvement on the Self-Confidence of the subjects. The result of the study is justified with following studies. The result of the present study was also supported by **Samsudeen and Kalidasan, (2007) and Avasle and Vallumurgan.**

The result of the Yogasana training indicates significant improvement on the Body Mass Index (BMI) of the subjects. The result of the study is justified with following studies. The result of the present study was also supported by **Ashutosh Chauhan, Deepak Kumar Semwal. Satyandra Prasad Mishra and Ruchi Badhini Semwal, (2017). Dr. Alok Sen Borman (2016).**

## **Discussion on Hypothesis**

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the Yogasana training on Physiological and psychological Variables of high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the Resting pulse rate for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the systolic Blood Pressure for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the diastolic Blood Pressure for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the  $Vo^2$  max for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the Stress for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the Self-confidence for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

The research hypothesis statement stated that 12 weeks of Yogasana training improves the performance of the Body Mass Index (BMI) for high school girls. The statement of the research hypothesis agrees with the results, hence, the hypothesis was accepted.

## CHAPTER -V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In the following sections, the purpose of the study, method, results is summarized. Following the summary, the results are discussed in light of available knowledge. Finally, conclusions and implications are drawn based on the finding of the present study.

#### Summary

The purpose of the study was to investigate the “**Effects of Yogasana on Physiological and Psychological Variables of High School Girls**”. The researcher selected Resting pulse rate, Blood Pressure, Vo<sub>2</sub> max and Body Mass Index for Physiological Variables, Stress and Self-confidence for Psychological Variables.

#### Hypotheses

To facilitate an elaborate discussion of the purpose of the study, the following specific hypotheses

It was hypothesized that the Yogasana Training improved the following Physiological and Psychological Variables of high School Girls.

- It was hypothesized that the Yogasana training develops Resting pulse rate.
- It was hypothesized that the Yogasana training develops Vo<sub>2</sub>max.
- It was hypothesized that the Yogasana training improves Systolic Blood Pressure
- It was hypothesized that the Yogasana training improves Diastolic Blood Pressure.
- It was Hypothesized that the Yogasana training improves overall BMI level
- It was hypothesized that the Yogasana training reduces the Stress.
- It was hypothesized that the Yogasana training develops Self-confidence.

#### Methodology – Subjects, Variables and Samples



For the purpose of the study 140 high school girls were recruited, the researcher conducted pre-test performance on Physiological and psychological Variables. Further 140 Girls were divided in to two different groups Experimental N=70 and controlled N=70. The performance of the pre-test was recorded. After the 16 weeks of Yogasana training the post-test performance was recorded on Physiological and psychological performance. 5 Physiological variables namely, Resting pulse rate, Systolic and Diastolic Blood pressure, Vo2 Max and BMI Similarly from Psychological 2 variables stress and self-confidence was taken.

### Administration of Tests and Data Collection

All the Physiological tests were taken under laboratory condition and psychological variables in class room. Physiological data was measured and recorded in metric system and psychological data was obtained through questionnaire and all the necessary permission was taken from subjects and respective authorities.

### Statistical Technique for Hypothesis I to VII

To test the first to seventh hypotheses, the available data were 140 and it was equally divided as per the group requirements. The entire two groups, namely experimental group and controlled group had N=70 members in each group. ANCOVA statistical technique was adopted for the investigation, computation was performed on SPSS 21.0 version software.

### Data transformation

A list of measures used in the study was presented in the methods chapter

### Summary of Results

The results are presented in to two sub-sections, namely, Physiological and Psychological; Based on the results of statistical analyses each of the hypotheses is evaluated. The entire Seven Hypotheses were **statistically accepted** as per the stated hypothesis in the first chapter.

### Discussion on findings

#### Physiological Variables

The obtained data on the subjects through application of statistical technique revealed that resting pulse rate, blood pressure become well and Vo2 Max capacity was improved through practice of Yogasana training. It is evident significantly greater improvements in selected Physiological variables of the present study. Thus, Yogasana helps the subjects to develop their physiological characters which help them for developing better resting pulse rate, improved systolic and diastolic Blood pressure similarly enhances the Vo2 MAX Capacity and improves BMI level in a successful manner.

### Psychological Variables

The obtained data on the subjects through application of statistical technique revealed that stress level was reduced, and self confidence level of the subjects was improved through practice of Yogasana training. It is evident significantly greater improvements in selected Psychological variables of the present study. Thus, Yogasana helps the subjects to develop their Psychological characters which help them for developing better at handling stress, improved self-confidence Capacity in a successful manner.

### Conclusions

The conclusion is made according to the aims of the study that was set for the study: It is noticed that the subjects who were involved in Yogasana training have positive effect on their health i.e. Physiological and Psychological variables

#### Conclusion on Physiological Variables

Twelve weeks of Yogasana training has shown significant improvement on Physiological variables of the subjects.

1. Twelve weeks of Yogasana training has shown significant improvement in resting pulse rate of the subjects.
2. Twelve weeks of Yogasana training has shown significant improvement in the systolic Blood Pressure of the subjects.
3. Twelve weeks of Yogasana training has shown significant improvement in the diastolic Blood Pressure of the subjects.

4. Twelve weeks of Yogasana training has shown significant improvement in the Vo2 max capacity of the subjects
5. Twelve weeks of Yogasana training has shown significant improvement in the BMI of the subjects

From the above findings, it can be concluded that by having 16 week Yogasana training the performance of selected Physiological variables were improved in from the pre-test scores. Further, Yogasana training helped to minimize the resting heart rate, both systolic and diastolic blood pressure also were minimized. It was also observed that Vo2 max also was improved significantly. Further it was also BMI level was improved during teaching as well as coaching, teacher and coaches should keep in mind about such physiological facts which help the students and athletes for better educational achievement as well as sports performances. Findings from the present investigation have been supported by much previous research work on the same parameters.

### **Conclusion on Psychological Variables**

Twelve weeks of Yogasana training has shown significant improvement on psychological variables of the subjects.

1. Twelve weeks of Yogasana training has shown significant improvement in controlling the stress of the subjects.
2. Twelve weeks of Yogasana training has shown significant improvement in the Self-confidence of the subjects

From the above findings, it can be concluded that by having 16 week Yogasana training the performance of selected Psychological variables were improved in from the pre-test scores. Further, Yogasana training helped to minimize the stress level and improved the self-confidence level. During teaching as well as coaching, teacher and coaches should keep in mind about such Psychological facts which help the students and athletes for better educational achievement as well as sports performances. Findings from the present investigation have been supported by much previous research work on the same parameters.

## Recommendations

Following are recommendations that can be made from the results of the present investigation:

1. The present investigation revealed that by performing 12 week Yogasana training selected physiological and psychological parameters were improved significantly. It is recommended, therefore, that male and female athletes may be divided into more age groups, skill wise groups to compare the discriminant functions for the youngest with that of the oldest.
2. In the present study sample size of young subjects was very small. Therefore, it is recommended to replicate such an investigation with larger sample size.
3. The present investigation involved Girls from high school level, more national and international research between countries can contribute to a more accurate profile. These norms can be used by coaches to identify potentially talented players.
4. The research investigator and the advisor recommend for further research work in similar line on women on age group, professional athletes and normal populations.

## Recommendations for Administrators, Coaches and Trainers

- 1 The present investigation revealed that that Yogasana training brings improvement, so the coaches can adopt this method in building the team for competition. Therefore, it is recommended that either training regime be made demanding and proper attention should be given on Yogasana training model in sports training.
- 2 Based on the research findings involving young Girls in yoga, identify talented Girls at an early age and coach them right. It is recommended that coaches based on their knowledge of Physiological and psychological required for various departments of the game may counsel their wards.
- 3 The relationships established in this research strongly recommend that coaches include Yogasana training in improving the fitness level and maintaining the proper psychological level.

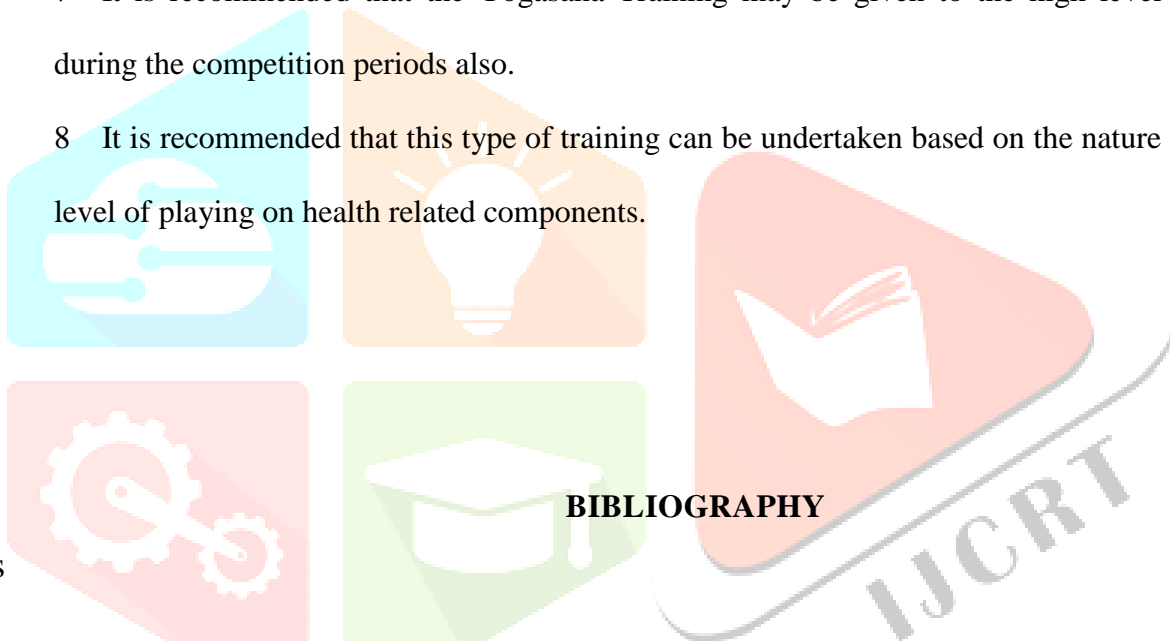
4 Yogasana Training may be added in their coaching and fitness programs and they should further be used in team selection processes as they are strong indicators for success and will make the selection process more objective.

5 For the development of Physiological and psychological performance Yogasana training programme may be included in the Physical education curriculum.

6 In the present study, the effect of Yogasana training on Resting pulse rate, Blood Pressure, Vo2 max, Stress and Self-confidence of high school girls, the physical education teachers, trainers and coaches can prefer this type of training so as to achieve their aim in time.

7 It is recommended that the Yogasana Training may be given to the high level performance during the competition periods also.

8 It is recommended that this type of training can be undertaken based on the nature of sports and level of playing on health related components.



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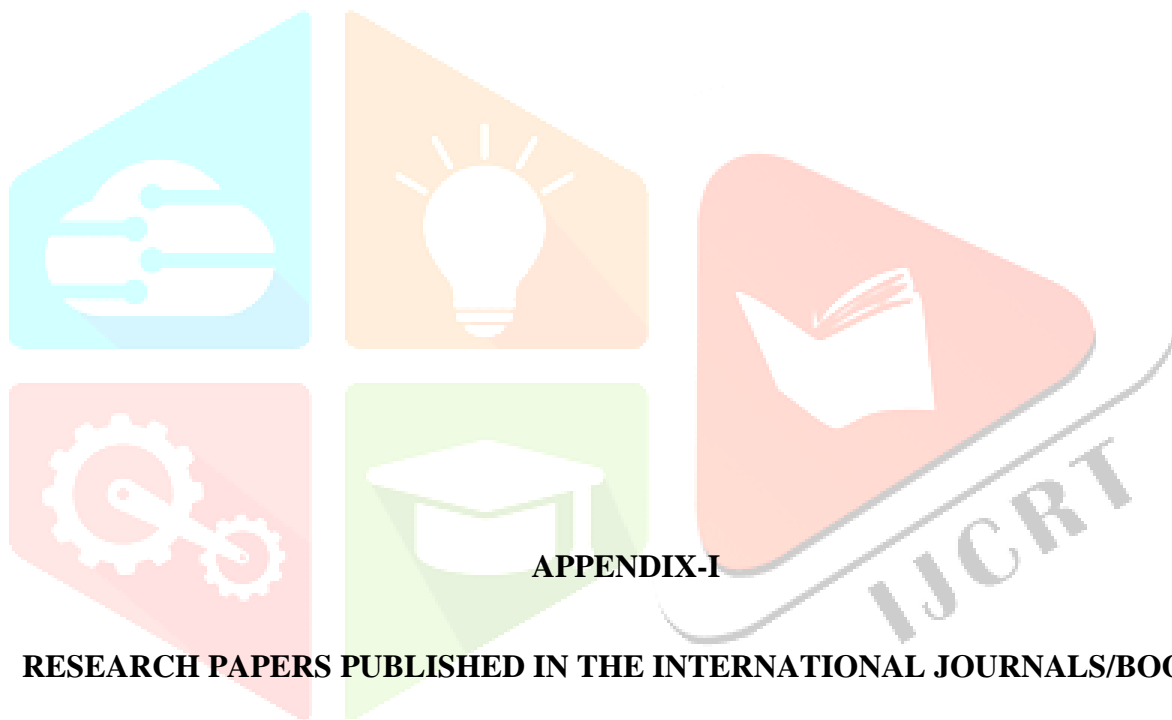
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#### APPENDIX-I

#### RESEARCH PAPERS PUBLISHED IN THE INTERNATIONAL JOURNALS/BOOKS

- International journal of multidisciplinary Education and Research- international journal vol 1; Issue 1; March 2016- Page No.23-25, ISSN NO.2455-4588. Published Paper on “Effect of Yoga on Motor Ability Components among Inter collegiate Cricket and Football Players of BITS, Pilani K.K.Birla Goa Campus Deemed University team”.
- International Journal of Physical Education, Sports and Health— international journal Accepted: 26-04-2017 page No.315-317, Impact factor (ISRA): 5.38, P-ISSN: 2394-1685, E-ISSN: 2394-1693. Published paper on “Effects of Yogasana on Physiological and Psychological Variables of high school girls”.

- International Journal of Physical Education, Sports and Health— international journal Accepted: 18-04-2017 page No.268-269, Impact factor (ISRA): 5.38, P-ISSN: 2394-1685, E-ISSN: 2394-1694. Published paper on “Effects of 6-Week Yoga training on Blood Pressure”.

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### Effects of Yoga practice on Motor Ability Components among Inter collegiate Cricket and Football players of BITS, Pilani K. K. Birla Goa Campus Deemed University team

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#### Abstract

The purpose of the study was to find out the effect of yogic practice on selected Motor Ability components among BITS Pilani-K.K.Birla Goa Campus Deemed University, Cricket, Soccer and Basketball Players. Fifty players from the above games were selected randomly as subjects. The age of the subjects ranged from 20 to 24 years. The selected subjects were divided into two groups namely Group A (yoga practice) and Group B (control without any training). The Group “A” was subjected to yoga training for alternative days every week for Four weeks in the month of April & May 2015. The dependent variables namely cardio respiratory endurance measured by 12 min cooper's Run/ Walk Test, Muscular Endurance Measured by Bent-knee sit ups, and Flexibility Measured by Sit and reach test. The data were collected from each subject before and after the training period and statistically analyzed by using dependent 't' test and analysis of covariance (ANOVA), It was found that there was significant improvement on yogic practice on selected motor ability components.

**Keywords:** Motor ability, cardio respiratory endurance, Muscular endurance and Flexibility

#### Introduction

Cricket, Basketball, and Football is a sport requiring high levels of physical fitness. These are the games which demands not only speed, agility, strength, power and endurance. These players need a combination of technical, tactical and physical skills in order to succeed. Improving aerobic capacity and overall fitness boosts performance on the Sports field. Physical fitness is not only the most important ways to a healthy body but it is also the basis of dynamic and creative activity. Physical fitness is the combination of strength, speed, flexibility, agility and endurance. It is the ability to enjoy our lives and achieve our goals without undue fatigue or stress. Physical fitness varies from person to person and different type of fitness and needed for different types of profession.

Yoga is a form of exercise based on the belief that the body and breath intimately connected with the mind. By controlling the breath and holding the body in steady poses, or asana, yoga creates harmony. Yoga is means of balancing and harmonizing the body, mind and emotion and is a tool that allows us to withdraw from the chaos of the world and find a quite space within. Pranayama are the best exercise to increase the capacity of lungs capacity (Namdev, C 2011).

#### Purpose of the study

The purpose of the study was find out the effect of yogic practice on selected Motor Ability components among university level Cricket, Football and Basketball Players.

#### Significance of the study

It is hoped that the data generated and interpreted in this study will one day help the sports fraternity, and the information collected can be used for monitoring the training programme and for counseling purpose for the development of sports.

#### Methodology

To achieve the purpose, fifty (50) BITS Pilani-K.K.Birla Goa Campus Deemed University, players of Cricket, Soccer and basketball team were selected randomly as subjects. All the 50 players were active sports person who represented the Institute team in the 2014-15 academic years. The experimental group was subjected to the yoga practices during morning hours for alternative days for Four weeks.

The training of Yoga was given to the subject at BITS Goa Campus. The age of the subjects ranged from 20 to 24 years. They were assigned randomly into experimental and control group of 25 each. Control group (n=25) was not given yoga practice, the yoga training was given to them in the month of April and May 2015, necessary permission was taken from BITS Goa Campus Sports Director. The measurements were all recorded in Metric system

Variables Tested	Cardio Respiratory Endurance	Muscular Endurance	Flexibility
	12 Minutes Run and Walk	Bent-knee sit ups	Seat and Reach

#### Statistical Procedure and Treatment

The data pertaining to the variables in this study were examined by using dependent 't' test to find out the significant

23



improvement and analysis of covariance (ANOVA) for each variables separately in order to determine the difference and tested at 0.05 level of significance.

#### Results and Discussion

The analysis of dependent 't' test on data obtained for cardio respiratory endurance, muscular endurance and flexibility of the pre-test and post- test means of yoga practice and control groups have been analyzed and presented in Table-I.

**Table 1: Mean and Dependent T Test of experimental and control groups on selected variables**

Variable	Mean	Experimental Group	Control Group
Cardio Respiratory Endurance	Pre-Test mean	1606.4	1568.4
	Post – test mean	1714.4	1532.4
	T test	2.40*	0.60*
Muscular Endurance	Pre-Test mean	29.32	28.44
	Post – test mean	32.2	27.68
	T test	1.53*	0.43*
Flexibility	Pre-Test mean	33.24	33.24
	Post – test mean	36.28	36.28
	T test	1.73*	1.73*

\*significant at 0.05 level of confidence (24) = 2.064

- The obtained 't' ratio value of experimental group is higher than the table value and it is understood that yogic practice had significantly improved the performance of cardio respiratory endurance, muscular endurance and flexibility.
- Since the obtained 't' ratio value of experimental groups are greater than the table value, it is understood that yoga

Training group had significantly improved the performance of cardio respiratory endurance, muscular endurance and flexibility.

The analysis of covariance on the data obtained on flexibility and explosive power due to the effect of yogic practice have been analyses and presented in Table II.

**Table 2: Analysis of covariance of experimental and control Groups on Selected Variables**

Variable	Adjusted post Test means		Source of Variance	SS	df	Mean Squares	"F" Ratio
	Experimental Group	Control Group					
Cardio respiratory Endurance	169.8	154.9	Between	276859.19	1	276859.19	75.83*
			Within	171606.27	47	3651.201	
Muscular Endurance	31.60	28.28	Between	136.69	1	136.69	58.64*
			Within	109.29	47	2.331	
Flexibility	36.37	33.14	Between	130.92	1	130.920.641	204.24*
			Within	29.98	47		

\*Significant at 0.05 level of confidence, df (1, 47) = 4.06

- Table II showed that the adjusted posttest mean values of Cardio Respiratory Endurance, Muscular Endurance and Flexibility of experimental and control group were 169.8 and 154.9 and 31.60 and 28.28 and 36.37 and 33.14 respectively.
- The obtained f-ratio value is 75.83, 58.64 and 204.24 which is higher than the table value 4.06 with df 1 and 47 required for significance at 0.05 level.
- Since the value of f-ratio is higher than table value, it indicates that there is significant difference exist between the adjusted posttest means of experimental group in improving the performance of cardio respiratory endurance, muscular endurance and flexibility when compared control group.

#### Conclusion

- The experimental group namely yoga practice group had achieve significant improvement on cardio respiratory endurance, muscular endurance and flexibility. Significant difference were found among the two groups namely yoga practice (experimental) and control groups.
- Yoga practice group founded better achievement towards improving the selected criterion variables such as cardio respiratory endurance, muscular endurance and flexibility.

- It was found that the improvement caused by yoga practice group was better than control group. The results are supported by the studies conducted by R.Murugesan (2000) and Govindarajulu N (2002).

#### Recommendation for Future Research work

Extensive research have been undertaken in several sports disciplines to identify Yogic relationship with of young players which enables coaches to identify promising talent in their respective sports disciplines. Therefore it is recommended to undertake same research can be done on normal population or other sporting population.

- In the present study sample size of Subjects was very small. Therefore, it is recommended to replicate such an investigation with larger sample size.
- It is recommended to investigate with either longitudinal or mixed longitudinal or cross section study.
- The present investigation involved players at University level. Such study can be done on national and international level may be accentuated for various reasons.

#### Recommendation for Coaches and Administrators

- Therefore it is recommended that either training regime be made demanding or select candidates with greater

- efficiency in Motor Fitness profile.
- Based on the research findings involving young children in sports, identify talented players at early age and coach them right.
  - It is recommended that coaches based on their knowledge of Motor Fitness and Yogic profile required for various departments of the game.

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## Effects of yogasanas on physiological and psychological variables of high school girls

Deepa S Rathod and Dr. Sakpal Hoovanna

### Abstract

The purpose of this pilot study was to "Effects of yogasanas on Physiological and Psychological variables of High School Girls". 50 purposively selected Students in Government High School Madhurakhandi, tq: Jamakhandi, Dist: Bagalkot, Karnataka. The age group of the subjects range between 13-16 years. Students were given the training of selected yogasanas for 2 weeks Result shows that the regular practice of yoga improved Physiological variables (Resting Heart Rate, Blood Pressure, Vo2max) & Psychological variables (Stress and Self-Confidence) significantly. Subjects were assigned into two groups: A (control:N-25) and B (experimental:N-25). To find out the differences between pre test and post test performance and to compare the improvements of two groups. The level of significance was 0.05.

**Keywords:** Yogasanas, psychological variables, high school girls, yoga practice

### Introduction

Yoga is the art and science of healthy living and is concerned with the which focuses on bringing harmful between mind and body. According to modern scientists, everything in the universe is just a manifestation of the same quantum firmament. Living with freedom in all walks of life, health and harmony shall be the main objectives of Yoga practice. Therefore, yoga incorporates a system of disciplines for furthering an integrated development of all aspects of the individual. Through the practice of the physical postures, or yogasanas, the spinal column as well as the muscles and joints are maintained in a healthy and supple state. The creative energies in a constructive way, and child exhibits more self-confidence, self-awareness and self-control. As yoga's popularity grows, more and more avenues of this ancient practice are begin explored. Yoga for student, quite a modern concept, grew out of parents, thinking their children could enjoy some of the benefits of yoga that adult do, such as, improved body awareness, co-ordination and stress relief. They can be due to various factors relating to physical, emotional, mental and responsible role in bringing up young children in a healthy environment which would enable each one to maximize their potential. Yet the potential of the school to enhance health is often underutilized. "School Health" has largely remained confined to medical checkups of children or some hours of health instruction including yoga in the curriculum. Yoga is a form of complete education that can be used with all students because it develops physiological and psychological variables, and creative talents. In this study a sincere effort has been made to investigate the effects of yogasanas on physiological psychological variables of high school girls.

### Statement of the Problem

The purpose of this study was to the Effects of Physiological and Psychological variables of High School Girls.

### Methodology

Total 50 girls were selected for this study. 25 experimental and 25 control. The students of Government High School Madhurakhandi, tq: Jamakhandi, Dist: Bagalkot, Karnataka. The average age of the subjects was ranging from 13-16 years.

~ 315 ~

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## Following tests were utilized for the Pilot study

VARIABLES	Tests /Tools Administered	Unit of Measurement
Physiological variables		
Heart Rate	Stop watch and stethoscope	No of Beats
Blood pressure	Sphygmomanometer	Mm/Hg
Vo2 max	Harvard step test	No of beats
Psychological Variables		
Stress	Questionnaire (Dr. Vijayalakshmi & Dr. Shruti Narain)	Scores
Self-Confidence	Questionnaire ( M. Basavanna )	Scores

## Data Collection

All data were collected, when they were attending their regular classes. The researcher her-self specialize in yoga and administered the yoga program. The subjects were participated in yoga training program six days in a week at indoor hall, only for a period of 2 weeks. Necessary instruction was given by yoga instructor, to the subject before the administration of training program. The required data in different components was collected from the students during training.

Measuring Physiological variables organized at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> days while psychological measurement were taken 6<sup>th</sup> day. After collection of pre-test scores on all the selected variables, on the same subject after two weeks yoga

training, the post test was conducted and data were collected health, physiological and psychological variables.

## Statistical Procedure

For analysis of the data collected from control and experimental group of girls, Mean and SD was computed to find out the "effect of yogasanas on physiological & psychological variables of high school girls". "t" test was applied. For testing the hypothesis, level of significance was set at 0.05 levels.

Shows the mean, SD, and t-value of the control group. In this analysis mean value of control group have minor improvement in Heart rate and no any changes in systolic BP, diastolic BP and Vo2 max were found.

Table 1: showing the Mean, SD and t-value of Control Group

Group	Variables	Test	N	Mean	SD	t-value	sig
Control Group	Resting Heart rate	Pre test	25	72.07	0.88	1.14	NS
		Post test	25	71.87	1.13		
	Systolic BP	Pre test	25	118.44	4.44	0.54	NS
		Post test	25	117.92	5.24		
	Diastolic BP	Pre test	25	82.36	4.63	1.65	NS
		Post test	25	80.16	3.73		
	Vo2 max	Pre test	25	59.88	5.73	-1.03	NS
		Post test	25	61.12	6.35		

0.05 level of significance

Table 1 shows the mean, S.D. and 't' values of RHR, SBP, DBP, and Vo2 max of High school girls of control group. Pre-Test mean and S.D. value of RHR has been calculated as 72.07 bpm  $\pm$  0.88 whereas mean and S.D. value of post test were found to be 71.87bpm  $\pm$  1.13 when t-test was applied it has shown the 1.14 value which in non-significant at 0.05 level. And SBP Pre-Test mean and S.D. value has been calculated as 118.44 mm Hg  $\pm$  4.44 whereas mean and S.D. value of post-test were found to be 117.92 mm Hg  $\pm$  5.24 when t-test was applied it has shown the 0.54 value which in

non-significant differences in this group, as well as pre-test mean and S.D value of DBP has been calculated as 82.36mm Hg  $\pm$  4.63 whereas mean and S.D. value of post test were found to be 80.16 mm Hg  $\pm$  3.73 when t-test was applied it has shown the 1.65 value which in non-significant at 0.05 level. And the mean and S.D. value of RHR has been calculated as 59.88 bpm  $\pm$  5.73 whereas mean and S.D. value of post test were found to be 61.12bpm  $\pm$  6.35 when t-test was applied it has shown the -1.03 value which in non-significant at 0.05 level.

Table 2: Showing the Mean, SD and t-value of Experimental Group of yoga training

Group	Variables	Test	N	Mean	SD	t-value	Sig
Experimental Group	Resting Heart Rate	Pre test	25	84.8	5.02	2.43	S
		Post test	25	80.5	3.16		
	Systolic BP	Pre test	25	120.92	1.8	5.6	S
		Post test	25	116.24	3.74		
	Diastolic BP	Pre test	25	84.8	5.02	2.43	S
		Post test	25	80.5	3.16		
	Vo2 max	Pre test	25	30.08	5.25	-4.72	S
		Post test	25	64.36	5.23		

Table 2 shows the mean, S.D. and 't' values of RHR, SBP, DBP, and Vo2 max of High school girls of experimental group. Pre-Test mean and S.D. value of RHR has been calculated as 84.8 bpm  $\pm$  5.02 whereas mean and S.D. value of post-test were found to be 80.5bpm  $\pm$  3.16 when t-test was applied it has shown the 2.43 value which in significant at 0.05

level. And SBP Pre-Test mean and S.D. value has been calculated as 120.92 mm Hg  $\pm$  1.8 whereas mean and S.D. value of post-test were found to be 116.24 mm Hg  $\pm$  3.74 when t-test was applied it has shown the 5.6 value which in significant differences in this group, as well as pre-test mean and S.D value of DBP has been calculated as 84.8mm Hg

~ 316 ~

$\pm 80.5$  whereas mean and S.D. value of post-test were found to be  $80.5 \text{ mm Hg} \pm 3.16$  when t-test was applied it has shown the 2.43 value which is significant at 0.05 level. And the mean and S.D. value of RHR has been calculated as  $30.08 \text{ bpm} \pm 5.25$  whereas mean and S.D. value of post-test were found to be  $64.36 \text{ bpm} \pm 5.23$  when t-test was applied it has shown the -4.72 value which is significant at 0.05 level.

#### Psychological variable

In psychological variable stress was measured by a score which was described by Dr. Vijayalakshmi & Dr. Shruti Narain and the self-confidence was evaluated by a measure which was proposed by M Basavanna. The reliability of such scores has already been done earlier. The final form of the

stress scale have 40 true-false type item and self-confidence have 100 true-false type items that works as parameter to check stress level and self confidence level of the adolescence. After calculating stress and self-confidence raw scoring key interpretation of individual score has been on the basis of criteria depicted in table No3:

Table 3

Stress		Self confidence	
Row scores	Dimensions	Row scores	Dimensions
0-13	Low	0-22	High
14-24	Moderate	23-55	Moderate
25-above	High	56-above	Low

Table 4: showing of Mean, SD and t-value of Control Group of Stress of self confidence

Group	Variables	Test	N	Mean	SD	t-value	Sig
Control Group	Stress	Pre test	25	26.04	5.55	-0.11	NS
		Post test	25	26.28	9.55		
	Self Confidence	Pre test	25	55.56	19.52	-0.02	NS
		Post test	25	55.62	17.66		

Table 5 shows the mean, S.D. and 't' values of Stress and self-confidence of High school girls of control group. Pre-Test mean and S.D. value of stress has been calculated as  $26.04 \pm 5.55$  whereas mean and S.D. value of post-test were found to be  $26.28 \pm 9.55$  when t-test was applied it has shown the -0.11 value which is non-significant at 0.05 level. And self-

confidence Pre-Test mean and S.D. value has been calculated as  $55.56 \pm 19.52$  whereas mean and S.D. value of post-test were found to be  $55.62 \pm 17.66$  when t-test was applied it has shown the -0.02 value which is non-significant differences in this group.

Table 5: showing of Mean, SD and t-value of Experimental Group of Stress of self-confidence of Yoga Training

Group	Variables	Test	N	Mean	SD	t-value	Sig
Experimental Group	Stress	Pre test	25	25.12	4.49	4.498	S
		Post test	25	20.24	2.86		
	Self Confidence	Pre test	25	54.96	18.05	1.529	S
		Post test	25	49	7.96		

Table 5 shows the mean, S.D. and 't' values of Stress and self-confidence of High school girls of experimental group. Pre-Test mean and S.D. value of stress has been calculated as  $25.12 \pm 4.49$  whereas mean and S.D. value of post-test were found to be  $20.24 \pm 2.86$  when t-test was applied it has shown the 4.49 value which is significant at 0.05 level. And self-confidence Pre-Test mean and S.D. value has been calculated as  $54.96 \pm 18.05$  whereas mean and S.D. value of post-test were found to be  $49 \pm 7.96$  when t-test was applied it has shown the 1.52 value which is significant differences in this group.

#### Conclusion

Significant difference was observed on the variables of Heart rate, systolic blood pressure, diastolic blood pressure, and  $\text{VO}_2 \text{ max}$  as a result of yoga training. The present study suggests that a 2-week of yoga training had significant effect on Heart rate, systolic blood pressure, diastolic blood pressure, and  $\text{VO}_2 \text{ max}$  and in the psychological variables of stress and self-confidence there was a significant improvement in the both scores in this study. Through a variety of effects including relaxation, bending stretching, and balancing of muscles, improvement of posture and breathing, action on pressure points, calming the nervous system.

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## Effects of 6-week yoga training on blood pressure

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### Abstract

According to medical scientists, yoga therapy is successful because of the balance created in the nervous and endocrine systems which directly influences all the other systems and organs of the body. The study was undertaken with the aim to observe the effect of yoga (asana) selected yoga training on blood pressure. For this study total 20 Girls students were selected as subject from of Government High School Madhurakhandi, Bagalkot, Karnataka Their age ranged between 13-16 years. Students were given the treatment of selected yogic asana for 6 weeks and consisted of daily sessions, lasting 45 min. Both systolic and diastolic blood pressures were measured with the auscultatory method by using sphygmomanometer and stethoscope. The mean and t-test applied the interpretation of data. The level of significance was set at 0.05.

**Keywords:** Blood pressure, systolic blood pressure, yogasanas

### Introduction

Yoga is a spiritual science for the integrated and holistic enlargement and magnification of our physical, mental as well as moral-spiritual facets. Yoga is based on the philosophy that is practical and useful for our daily lives. Yoga constructs desirable physiological alterations and has sound scientific foundations. The most important benefit of yoga is physical and mental therapy. Indians have given great importance to „yoga“ and „physical exercises“ not only to prevent or cure the physical ailments/diseases but to keep fit also. Yoga is ultimate for developing harmony among body, mind and spirit. Yoga asana are ways of moving and/or holding the body in different position. Yoga asana has several exercises or postures that work wonders on fitness and health. Yoga asana boost physical strength, stamina and flexibility, improve blood circulation, enhance posture and muscle tone and bestow greater powers of concentration and self-control. To compare with other games and exercises which provide only muscular and cardio-vascular fitness, Yoga gives an all-round development and as a result this study was undertaken to find out the effects of selected yogasanas on blood pressure.

### Material and Methods Subjects

The present study was done to know the effect of yoga on blood pressure in healthy volunteers above the age of 13 years. Twenty purposively selected girls blood pressure from Government High School Madhurakhandi, Bagalkot, Karnataka. Subjects were assigned into two groups: A (experimental: N-10) and B (control: N-10). All subjects, after having been informed about the objective and protocol of the study, gave their written consents. The subjects from Group A were subjected to a 6-week yogic exercises training program. This lasted 6- weeks and consisted of daily sessions, lasting 45 min each, which included five Asanas: Pachimottanasan, Garbhasana, Navasana, Tadasana and Sarvangasana. The six days in a week was observed in training. Both systolic and diastolic blood pressures were measured with the auscultatory method by using sphygmomanometer and stethoscope. Three readings were taken and their average was recorded. Three readings were taken and their average was recorded

### Data analysis

The between-group differences were assessed using the Student's t-test for dependent data. The level of 0.05 was considered significant.

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**Results****Table 1:** Mean, SD and t-values of systolic blood pressure of girls of control and experimental group during Pre test and Post test

Group	Test	N	Mean (mm Hg)	SD	t-value
Control Group	Pre test	10	119.1	1.79	1.58
	Post test	10	117.4	2.95	
Experimental Group	Pre test	10	121.5	2.61	3.25
	Post test	10	116.7	4.68	

Significant at 0.05 level

Table 1 shows the mean, S.D. and 't' values of systolic blood pressure of High school girls of control group and experimental group. Pre-Test mean and S.D. value of control group has been calculated as 119.1 mm Hg  $\pm$  1.79 whereas mean and S.D. value of post test were found to be 117.4 mm Hg  $\pm$  2.95 when t-test was applied it has shown the 1.58 value which is non-significant at 0.05 level. Pre-Test mean and S.D. value of experimental group has been calculated as 121.5 mm Hg  $\pm$  2.61 whereas mean and S.D. value of post test were found to be 116.7 mm Hg  $\pm$  4.68 when t-test was applied it has shown the 3.25 value which is significant differences in this group.

**Table 2:** Mean, SD and t-values of diastolic blood pressure of girls of control and experimental group during Pre test and Post test

Group	Test	N	Mean (mm Hg)	SD	t-value
Control Group	Pre test	10	84.8	5.02	2.43
	Post test	10	80.5	2.59	
Experimental Group	Pre test	10	82.36	4.63	1.65
	Post test	10	80.8	3.73	

Table 2 shows the mean S.D. and t-test values of diastolic blood pressure of males of control group and experimental group. Pre-Test mean and S.D. value of control group has been calculated as 84.8 mm Hg  $\pm$  5.02 whereas mean and S.D. value of post test were found to be 80.5 mm Hg  $\pm$  2.59 when t-test was applied it has shown the 2.43 value which is non-significant at 0.05 level. Pre-Test mean and S.D. value of experimental group has been calculated as 82.36 mm Hg  $\pm$  4.63 whereas mean and S.D. value of post test were found to be 80.8 mm Hg  $\pm$  3.73. when t-test was applied it has shown the 1.65 value which is significant differences in this group.

**Discussion**

Yoga provides the path to achieve greater perfection of the body, life and mind. Yoga promotes a harmonious working together of the body's components leading to both physical and mental training. Asana play significant role in toning up the neuro-muscular glandular system of the body to maintain the vitality of bodily organs. It is natural to ask whether the progress toward perfection is reflected in objective reproducible changes in physiological variables. The significant change in diastolic blood pressure observed in the present study suggests that Yogic exercises might have any immediate effect on peripheral vascular resistance and to reduce heart rate. Results of this study also supported by (Joshi *et al.* 1992) who suggest that Yogic asana and pranayama have been shown to reduce the physiological parameters such as resting respiratory rate and increase vital capacity, timed vital capacity, maximum voluntary ventilation, breath holding time and maximal aspiratory and expiratory pressures.

**Conclusion**

Significant difference was observed on the variable blood pressure as a result of yoga practice treatment. Insignificant difference between pre and post test of control group was observed. In conclusion, the present study suggests that a 6-week of yoga practice training had significant effect on blood pressure through a variety of effects including increases endurance, strength, and better flexibility, and promote a balanced development of the body parts, reduce stress. These data provide more evidence to support the beneficial effect of yoga asana training on reducing blood pressure.

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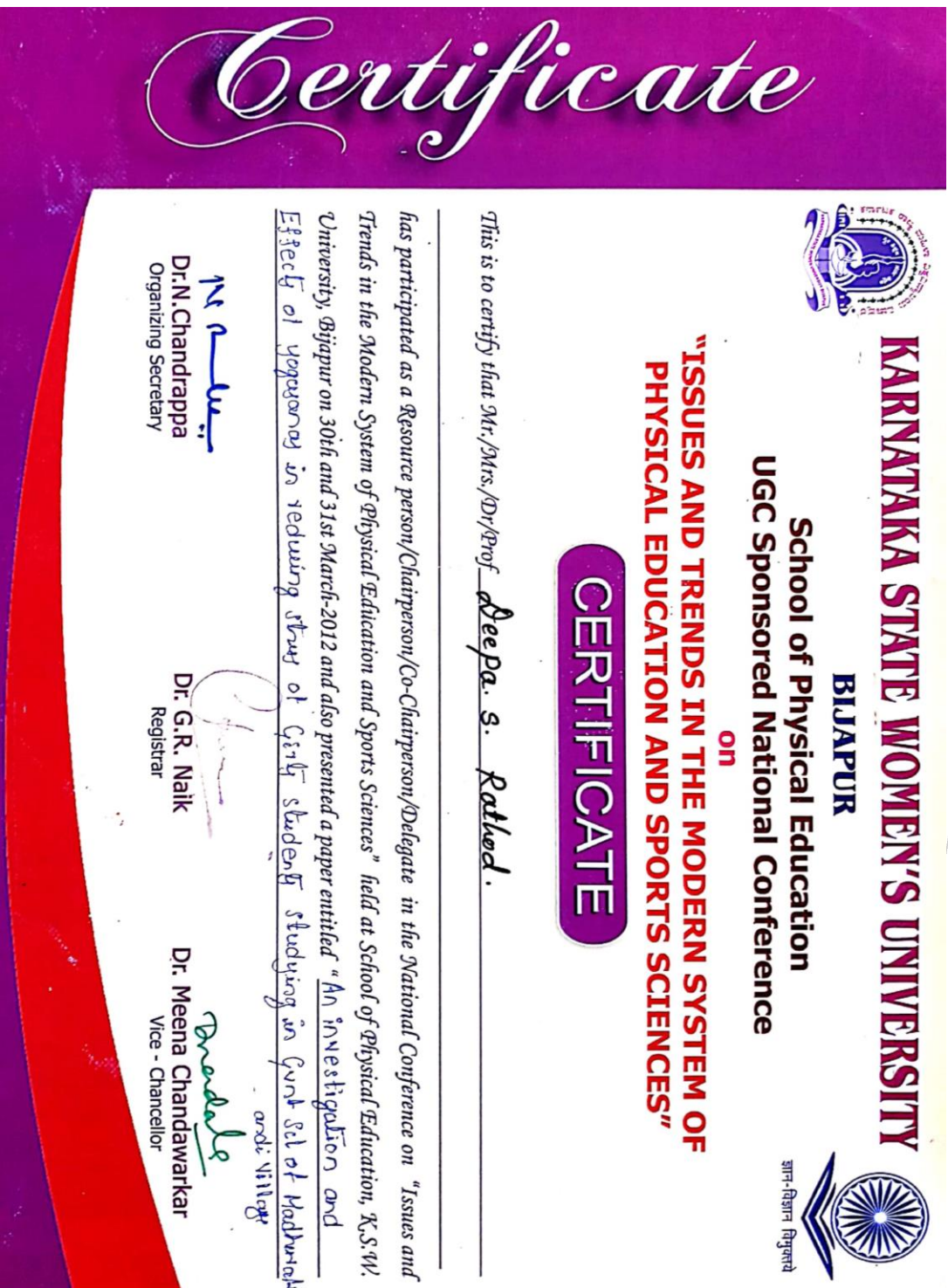
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**APPENDIX-II**

## RESEARCH PAPERS PRESENTED IN THE INTERNATIONAL AND NATIONAL CONFERENCE CERTIFICATES



- National Seminar on “Issues and trends in the modern system of Physical Education and Sports Sciences” organized by Karnataka State Women’s university Bijapur, Which was held on 30 and 31th march 2012. Presented Scientific Paper on the title, “An Investigation and Effects of Yogasanas in reducing Stress of Girls Students Studying in Govt. School of Madhurkhandi Village”.
- International Conference on “International Conference on Yoga Therapy for Stress Disorders” organized by Department of Human Consciousness and Yogic Science and Dharmanidhi Yoga Peetha, Mangalagangothri Mangalore University. Held on 3 and 5 February 2015. Presented Scientific Paper on the title, “Reducing Stress through Yoga Asanas of High School Girls”.
- National Level Seminar on “on day National Level Seminar on Teaching Practices in History, English and Physical Education: Issues and Challenges” organized by Government First Grade College HunnurTq.Jamkhandin District. Bagalkot, Karnataka State. Which was held on 4<sup>th</sup> April 2016. Presented Scientific Paper on the title, Stress and Self-Confidence among High School Girls”.
- International seminar on “Status of Women in India” organizing by Deccan Studies and Historical Research Association Bijapur, Vijayapur In Collaboration with Karnataka State Women’s University, Vijayapur. Which was held on 26<sup>th</sup> February 2017. Presented Scientific Paper on the title, “Health Benefits of Yoga for Women’s”.
- National Conference on “The role of Women’s Participation in Sports for Women Empowerment” organized by Shri PadmavatiMahilaVisvavidyalayamTirupatiAndhra Pradesh, India. Which was held on 22<sup>nd</sup> - 23<sup>rd</sup> March 2017. Presented Scientific Paper on the title, “The Role and Importance of Yoga in Sports and Daily Life”.
- Inter National Conference on “Physical Education, Fitness and Sports Science” organized by Department of Physical Education, Osmania University, Hyderabad, T.S.India. Which was held on 19<sup>th</sup> - 20<sup>th</sup> August 2017. Presented Scientific Paper on the title, “Effects of Yogasanas on Heart rate”.









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This is certify that Mr./Mrs./Dr./Prof. Deepa S. Redhod has  
participated / Resources person/Chairperson/presented a paper title Stress and Self-  
Confidence Among High School Girls in the One Day National Level Seminar on "Teaching

practices in History, English & Physical Education : Issues & challenges " held on 4<sup>th</sup> April 2016,  
Organized by the Dept. of History, English, Physical Education Government First Grade College  
Hunnur-587119, Karnataka, India.

Prof. Santosha B. Rajput Prof. N.M.Yambhatnal Dr. Rajeshkumar Prof. S.S.Halemani  
Organising Secretary Co-Ordinator of IQAC Dept. of Physical education Principal  
Department of Physical education GFGC Hunnur Osmania University, Hyderabad GFGC Hunnur



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*Certificate*

This is to certify that Prof./ Dr./ Mr./ Ms. Deepa S. Rathod participated as

Resource Person/ Chairperson/ Co-Chairperson / Delegate/Author/ Co-Author Presented a Scientific Paper on

The Role and importance of yoga in sports and daily life.

in UGC - Sponsored National Conference on "The Role of Women's

Participation in Sports for Women Empowerment" on 22<sup>nd</sup> - 23<sup>rd</sup> March 2017 Organized by Department of Physical Education,

Sri Padmavati Mahila VisvaVidyalayam, Tirupati, Chittoor Dist., A.P.

*[Signature]*  
Conference Director

*[Signature]*  
Registrar



