Chapter -1

Introduction
CHAPTER-I
INTRODUCTION

“Better to hunt in fields, for health unbought,
Than fee doctor for a nauseous draught
The wise, for cure, on exercise depend,
God never made his work for man to mend.”

John dryden

Physical fitness is now more or less a matter of national concern. The strength of democracy is the collective well-being of our people. We live in a labor saving and mechanized society, which is eliminating more and more physical exertion from our day to day life. The industrial development is responsible for mechanical devices such as washing machine, water motor, vacuum cleaner, cooking gas, vehicles and telephone system and the like which have reduced human labour for domestic work, dish antenna, radio, internet, tape recorder have reduced normal physical activities such as playing in field, walking and other daily routine work. Due to reduced physical labour the effects of a sedentary life style can be seen in people around us, Over weight, poor flexibility, diminished muscles tone, bad posture, sluggish-ness, lack of breath, poor cardio vascular endurance, when performing even simple work, there are some common signs that something is wrong with the way we live.

The human body is similar to a machine. If mistreated and not properly maintained, the machines will malfunction and cease to run efficiently. Our bodies are similar, in proper maintenance fosters deterioration of the numerous physiological systems with in the body. It is a vital issue now to discuss that physiologists have expressed that physical exercise improves and promotes the efficiency of the whole organism and is essential for the proper functioning and maintenance of
all the systems of the body. A balanced programme of physical fitness is of profound importance to the life of an individual. There is scientific evidence that neglect of regular activity mainly during adolescence can not be fully compensated later on in life.

Yoga is universally benefiting all people of all ages. The study of yoga is fascinating to those with a philosophical mind and is defined as the silencing of the mind’s activity which leads to complete realization of the intrinsic nature of the Supreme Being. It is practical holistic philosophy designed to bring out profound state of well as an integral subject. This takes in to consideration man as a whole. The aim of yoga is to devise ways and means of helping to better emotion and intellectual concentration.

The word yoga is derived from the root “YUJ” or yoke that means union or merger (to bend together or concentrate). The merger of soul with god and the experience of oneness with him are meant by yoga. The state of Samadhi can be attained through yoga. “The withdrawal of sense organs from the worldly objects and their control is yoga”

**Vethathiri, Y. M. (1985)** states, “yoga is a systematic physical practice to improve awareness, to develop willpower and to realize self, join traditional consciousness (jeevathama) to super consciousness (permathamama).

**Hera, C. (1984)** says that yoga was first summarized and systematized around the second century A. D. by Patanjali and his yoga sutra still regarded as classic work on the subject. Hence, Patanjali is knows as the father of yoga. He has joined a number of yoga sutras regarding yoga.

Yoga not only keeps you fit, it also offers remedies to cure many disease, yoga has been recognized by all over the world, even by the world health organization also accepted it as an effective alternate
therapy. Which is a very practical & most effective and free of side effects, Yoga views health as a balance of the body system – physical, mental, emotional and spiritual, all aspects of a person are inter related, this principle is called wholism (state of wholeness), according to this principal the root of disease, injury and lack of physical and physiological fitness is the imbalance of internal condition of the human body for which improper lifestyle and dietary habits of the individual are to be blamed, yoga believes that it is the individual who is responsible for both causing and coming disease. Yogic practices can be preventive or curative and also helpful to improve the physiological and psychological variables because in the games and sports the performance and injury are related with human mental status, physical status, physiological status, emotional balance, attention and information receiving, same way in general population also. Such all these aspects can be controlled and improved through yoga. In yogic practices we perform various body postures (asanas, pranayama, kriyas) they provide good flexibility, massage and strength of our body organs. So that they may be capable to bear stress. In addition to it ability to help reduce stress, yoga has many other benefits for a man’s health. One of the primary aims of the physical practices of yoga is to improve the alignment and flexibility of the spine. This is encouraging news for them who are estimated to seek help. Physical fitness is based upon a solid foundation of the good health and good health depends upon physiological and psychological state of individual. Healthy living implies free from disease, sufficient strength endurance, skill, capacity to meet the daily demands and sufficient reserves to meet extraordinary stresses without undue fatigue besides mental development and emotional balance according to the maturity level of the individual.
Feuresteen, G. (2001) says that Yoga has been practiced in India for thousands of years, and is traditionally used by spiritual seekers as a system of self-development for purification of the body and mind. Yoga is proposed to be a preventive as well as curative system of the body and mind.

Prime among yoga’s many health benefits is its proven ability to help reduce stress. Mercurio, A. & Mercurio, R. (2010) and The American Medical Association (2009) stated that up to 80% of all illness is caused by stress. The activities and stimuli of contemporary life are constantly triggering what scientists refer to as “the fight or flight” mechanism. This expression refers to the way in which we respond to stress. This response is involuntary, and includes an elevation in heart rate, blood pressure, respiratory rate, and the creation of toxic chemicals in the body. Yoga helps to induce the opposite effects, in what Benson Herbert, M. D. (2009), termed “the relaxation response” in his groundbreaking book of the same title, yoga can help to reduce blood pressure, heart rate and improve circulation to help remove toxic wastes from the body. This may in turn help boost the functioning of the immune system. Yoga is so effective at inducing the relaxation response that many prominent authorities recommend its use for reducing stress and promoting health and physiological variables, including Ornish Dean (1996). Indeed, much to the astonishment of western scientists, accomplished yogis have demonstrated that they can exert conscious control of heart rate, blood pressure, respiratory rate and even the circulation of the blood.

Yoga is an ancient Indian culture and ways of life and is claimed to endow upon a person who practices it with perfect physical mental and spiritual health. The efficiency of yoga on physiological and
psychological variables has been well proved by (Ganguly, S.K. 1981; Joshi, A. R. & Pansare, M. S. 1985; Ghose, S. K. 2003; Rajkumar, N. V. 2010; Santoshi, J. 2010). Moreover, on the basis of various research reports yogic practice has now been found useful for cardio-vascular fitness (Chinnaswami, K. 1992; Ganguly, S. K. & Gharote, M. L. 1989; Singh, et. al, 2007; Lega, S. 2010). However there is some multiplicity in opinion about the efficacy of yoga practice on cardiovascular efficiency. Ganguly, S. K. (1981) recorded improvement in cardio respiratory endurance as a result of yogic practice, however this result does not show similarity with the result of Ganguly, et. al. (2003), although there may be difference in experimental condition and difference in the training stimuli.

The practice of Hatha yoga had proved to be of great help in the treatment of certain ailment as shown by the scientific investigation carried out in India and else where. It is a way of achieving perfect health of all parts of the body and influencing breathing and other functions going in it and through them bringing a perfect harmony in mental and physical activities. It helps to prepare a healthy body and mind in such a way that a necessary equilibrium is established in over all functions.

Yogic practices involve symbolism and body language. The characteristic feature of asanas is that several of them involve stretching of the musculature and exerting pressure or squeezing of the body parts, providing exercise to the joints, muscles and internal organs. There are specific asanas to selectively exercise chosen areas and organs of the body. Yogic practices contribute to the health and vigor of the whole body. Both the voluntary and involuntary systems of the body are exercised in yogic practices.
In practicing yogic practices attention is paid to the sensation generated by the movement as well as to the stillness. Co-ordination of breath with movement is also emphasized. As a result body awareness increases and the practitioners become sensitive to the inner processes (Gore, M. M. 1980). As emotions often reflect in the body, asanas provide a means to deal with the emotional blocks and characterological muscle tensions. A regular practice of asanas may be helpful to change the disposition and attitudes that lead to adjustment in life. For example, posture of strength (vajrasana), posture of attainment (siddhasana) posture of a hero (dhirasana) among others, may help to bring about a change in the attitudes of the individual. Relaxation postures such as Shavasana and Makarasanas, which involve concentration on specific muscle groups of the body, may help to overcome tensions and restlessness. Yogic relaxation postures have already been found in systematic research to reduce anxiety, Psychometric complaints and emotional repressions (Shenbagavalli, A. & Vallinmurugan, V. 2009; Wanger, M. A. & Bagich, B. K. 1996; Singh, S. et al. 2007).

In his foreword to Iyengor's, B.K.S. "light on yoga", (1974) it was observed that yoga induces the practitioner a primary sense of measure and proportion. It refines and animates every cell of the body unlocking and liberating capacities such as strength of will, impetus, ambition and toniccy. Yoga is ideally suited to prevent physical and mental illness and to protect body. Generally developing an inevitable sense of self-reliance and assurance. According to Yoga once mind becomes calm and steady, clarity improve and person becomes more aware of the forces which bring about disturbances. He is thus mentally better equipped to deal with any situations with a tranquil mind. He remains unperturbed in difficult situations even when internal factors have not changed.
Krishnan, A. (1991) observed that due to the selected bhartiyaam exercise and yogic practices pulse rate was decreased significantly and breath holding time, cardiovascular efficiency and vital capacity improved significantly.

Man has made tremendous progress in almost every walk of the life. Modern scientist and researchers have absolutely changed the lifestyle. However pollution of air, water, and such as others also the result of the science. Longing for material wealth has hardened the hearts of human beings. Human values are declining. Strain and stress are cause of physical as well as mental distraction Yoga has the surest remedies for men’s physical, physiological as well as psychological elements. It makes the organs of the body active in their functioning and has good effect on internal functioning of the human body.

Yoga is not a religion. It is a method by which one obtains control of one’s latent powers. It means complete self realization. Yogis achieve this by turning their thoughts inward, away from the objective world. By yoga life is so organized and so satisfying that in its twilight a person will be content to let go without regrets and a sense of leaving too much undone. Philosophy does not quarrel with any religion or faith and can be practiced by any one, who is sincere and willing to search for truth. There is no vague doctrine involved. Even comparatively little effort, will bring immense returns of knowledge, strength and pace. Yoga regards physical body as an instrument for journey towards perfection. Yogic practices develops not only the body, but also broadens the mental faculties. (Vishundevananda, Swami. 1959).

Gore, M. M. (1984). Stated that when the asana are performed in yogic way and maintained easy and effortlessly, various muscles tendons and joints are stretched smoothly and pleasant. This static stretching with relaxation is known as passive stretching where the stretching of the
muscles and tendons do not cross the natural limits and therefore there is no strong reflux contraction of the muscles, on the contrary muscles may surrender easily to such passive stretching, offering no resistance. There is no question of the muscular tension, on the other hand the muscle tone remains at its optimum level or even gets reduced to a great extent depending upon muscles involved in which pattern of posture. We know that the muscle tone is the basic of the posture and gets influenced by emotional or psychological state of an individual. When the muscles tone is reduced due to the passive stretching of the joints and muscles, it gets a soothing or tranquilizing effect on the nerves. There is absence of the internal disturbance (Vikshepas) or clashes (Dvandvas) and one can overcome the instability (Anagameja Yatava) in the body and mind. Internal awareness in such relaxed and stable posture not only tranquilizes the mind but also conditions it through the postural reflux cerebellum- hypothalamus functional axis. The systematic activity is withdrawn and parasympathetic activity restores the stability of various levels. Now the body starts telling the mind through various sensations which are perceived from proprioceptors and intergraded by lower centers involuntarily. That is why a long term effect of such performance is seen on the behavioral pattern of the individual.

Yogic techniques are known to improve over all performance, Patanjali in his yoga sutras describes yama, niyam, asana, pranayam, pratayahara, dharana, dhayana, and Samadhi, as eight parts (angas) of yoga. Amongst them in the present materialistic world, the third and fourth part asana and pranayama are considered as very important part and prescribed by modern medicine too. Many physicians now recommend yoga to, patients at risk for heart deceases as well as those with back pain, arthritis and other chronic deceases. Because asanas are physical practices to prepare body and mind in such a way that a
necessary equilibrium (samatvam) is established in overall function. It is sort of reconditioning of psycho-physiological mechanism of the body as a whole. Yoga postures can help improve circulation and eliminate toxic waste substances from the body. They can help promote optimum functioning of the internal organ by helping to massage and tone them. Yoga postures can help open the area of the pelvis and organ of reproduction that are housed there. Yoga practices can help bring increased circulation muscular control and awareness to a man's sexual region thus promoting enhanced sexual enjoyment.

The breathing practices of yoga can help improve lung capacity and posture, and harmonies the body and mind. The meditation practices of yoga can help still mind and bring about greater inner clarity, peace of mind, and self understanding and acceptance. This can help lead to greater emotional awareness and stability. For those men seeking spiritual enlightenment, yoga has a variety of techniques that can help support and guide you on your path. The beneficial effect of different pranayama (breathing exercise) produces different physiological responses in normal young volunteers. Kapalbhati, nadi-suddhi pranayama (alternate nostril breathing) are well known among them. Thus breathing exercise is reported to influence cardio respiratory and autonomic function.

Yoga is an ancient scientific system that, in fact brings harmony in body and mind. Indian Sages, for the spiritual advancement of an individual, have developed various stages of Yoga. Yoga, in fact tackles all the aspects of physiological functioning (Joshi et al, 1992, Joshi & Pansare, 1985, Telles & Desiraju, 1992; Usha & Samasundaram, 1986, Vidya & Pansare, 1986) and human personality too. It is very rational and scientific method by which a state of equilibrium in mind and body is achieved. But it is certainly not a miraculous power or mere
physical exercises as commonly understood. Although physical exercises have a physical beneficial effect on our system which facilitate to achieve optimum physical efficiency however highly extensive exercise are today found harmful.

In this case, Yoga seems to be a means for developing good health and vigor. To achieve this and to keep one free from diseases, most of ancestors and Sages used to practice certain asanas, pranayamas, shuddhi kriyas and mudras.

**Dhanaraj, H. (1974)** stated the effect of yoga and a fitness plan on selected physiological parameters, the result after practice of yoga indicated an increase in vital capacity, chest expansion, breath holding time and body flexibility. But there was a decrease of the heart rate.

**Chinnaswmy.K. (1992)** observed that hemoglobin content and blood sugar level were improved significantly whereas the pulse rate and diastolic pressure had been lowered in resting condition. However there was no significant change in systolic pressure.

Moreover on the basis of various research reports, Yoga has now been found useful for physical and mental fitness (**Bera,T.K. and Rajapurkar, M. V. 1993; Ganguly, S. K and bhole, M. V. 1985; Gharote, M. L. 1976; Sankardhayal, K. 1996**). The reports also revealed that yoga is made both accessible and acceptable to the people as a routine practice might help oneself to be freeing from any form of chronic disorders (**Bhagwat, J. M. 1986; Bhole, M. V. 1985; Raghuram, N. V. et al, 1992; Udupa, K. N. and Prasad, R. C. 1985**).

Yoga is a traditional Indian system of physical culture or fitness also claims to have better health status of general public (**Anand, B. K. 1993; Ganguly, S. K. 1981, Somani, et al, 1996; Udupa, K. N. 1985**) our ancestors also experienced that appropriate practice of yoga
significantly reduces the risk factors of ill-health problems by enhancing cardiac efficiency. It is therefore necessary to understand that yoga is not only a philosophy but it also deals with metaphysical, ontological, psychological, theological and physiological aspects in human life.

The word ‘exercise’ seems to be composed of ‘ex’ the component derived from ‘arcer’ meaning to ‘lock’. Thus, ‘exercise’ means to unlock or to free a part to move. It suggests, exercise as muscular movement. It is the name given to exercise that are employed in general fitness programmes for gaining muscular flexibility, Strength and grace exercise refer to a programme of free hand exercises generally done rhythmically to promote flexibility, strength and coordination of muscles involved in an activity. Exercises are divided into different sets that help in developing particular muscles of legs, thighs, arms, abdomen and back etc.

A standard definition of ‘exercise’ from the practical point of view may formulate as any bodily exertion for the sake keeping the organs and their function in a healthy state.

Exercises are divided into aerobic and anaerobic groups. Anaerobic physical exercise (activity) is done in the absence of oxygen, where as aerobic physical activity is done in the presence of sufficient amount of oxygen for metabolic reactions.

Aerobic activity is usually an exercise done with intensity hard enough to achieve the target heart rate of 60% to 65% of one’s maximum heart rate and one’s metabolic rate between 50 to 60% of max vo2 of prolonged periods of time. During which constant supply of oxygen is maintained by the circulatory system to the working muscles in order to metabolize carbohydrates and fat for the production of energy. Thus during aerobic activity, the heart, lungs and blood vessels supply oxygen and nutrients to the muscle cells to meet the demand of long durations
physical activity. Because of the importance of the total fitness effect and the fact that it is more readily attained in aerobic exercise programs and also because of the potential hazards and compliance problem associated with high intensity is recommended for the non athletic individuals

Uppal, A. (1986) studied the haematological response to graded exercise in male belonging to high and low fitness groups and noted a significant increase in red blood cells, white blood cells and hemoglobin variables.

The blood serves as peripheral transport of the body, carrying oxygen, nutrients, and chemical messages to the tissue, and waste products and synthesized metabolites away. The circulatory system provides access to all cells of the body for materials ingested or prepared else where in the organism. Thus, blood plays many important roles in co-ordination the individual cells into a whole complex organism. This is accomplished by the presence in the fluid of dispersed or dissolved nutrients, metabolites, electrolytes, hormones, substances to counteract infection and hemorrhage, and by equilibrium between the cell and the blood stream so that homoeostasis with respect to temperature, oxidation, reduction potentials and ionic concentration is maintained through out organism.

The blood consists of two parts – a fluid the plasma and a solid part the corpuscles. The plasma forms about 55 percent and corpuscles nearly 45 percent of the total blood volume. The blood corpuscles are of three kinds- the red or the erythrocytes, the whites or the leukocytes, and the platelets. Plasma is a yellowish liquid containing many substances in solution, some only in minutes traces, but nonetheless just as important. The chief of them are glucose, aminoacides, inorganic salts, hormones, urea, acid, proteins, hemoglobin, and cholesterol and dissolved gases-
oxygen, carbon dioxide, and nitrogen. The percentage composition of some of those constituents changes as a result of exercise.

The major function of red blood cells is to transport hemoglobin, which in turn carries oxygen from the lungs to the tissue. In some lower animals hemoglobin circulates as free protein in the plasma, not enclosed in red blood cells, however, when it is free in the plasma of the human being, approximately 3 percent of it leaks through the capillary membrane into the tissue spaces or through the glomerular membrane of kidney into Bowman's capsule each time blood through the capillaries. Therefore, for hemoglobin to remain in the bloodstream, it must exist in red blood cells. (Guyton, C. 1976)

The number of red blood cells is affected by exercise. Even after a short bout of exercise, such as 220 yard run, the number of red blood corpuscles increases. The increase depends on the load and duration of exercise. This increase in the number of red blood corpuscles for a given exertion is not constant, but seems to be modified by previous activity and stage of digestion among other factors. This increase is of short duration and within a few minutes after cessation of exercise the number of corpuscles begins to diminish, and within half an hour to two hours it will return to pre-exercise level. (Karpovich, P. & Sinning, W. 1971)

The leukocytes are the mobile unit of the body's protective system; they are formed partially in the bone marrow (the granulocytes and monocots, and a few lymphocytes) and partially in the lymph tissue (lymphocytes and plasma cells), but after formation they are transported in the blood to the different parts of the body where they are to be used. The real value of the white blood cells is that most of them are specifically transported to areas if serious inflammation, thereby providing a rapid and potent defense against any infectious agent might be present.
Exercise of any type increase the leukocytes; even random activity causes a significant rise above the basal level. Following brief period of exertions the increase in white blood counts is caused primarily by an increased number of lymphocytes, but if the exercise prolonged, the further rise in cell count is caused almost entirely by an increase in the neutrophils. The greater the degree of stress associated with exercise, the greater rise is in the white cells count, and such the less fit persons show a greater rise than do the athletes when same exercise is performed by both. (Morehouse, L. E. & Miller, A. T. 1971)

Cholesterol is present in the diet of all persons, and it can be absorbed slowly from gastrointestinal tract into the intestinal lymph. It is highly fat soluble, but only slightly soluble in water, and it is capable of forming esters with fatty acids. Indeed, approximately 70 percent of the cholesterol of the plasma is in the form of cholesterol esters.

There are some factors which effect the plasma cholesterol concentration. (1) An increase in amount of cholesterol ingested each day increase the plasma concentration slightly. However, when cholesterol is ingested, an intrinsic feed back control system for control of the body cholesterol causes the liver to compensate to a great extent for this by synthesizing smaller quantities of endogenous cholesterol. As a result, plasma cholesterol concentration usually can not be changed upward or down ward more than +/- 15 percent by altering the diet, though extremes of the cholesterol in the diet can probably alter the level by as much as +/- 30 percent. (2) a saturated fat diet increase blood cholesterol concentration as much as 15 to 25 percent. This presumably form increased fat deposition in the liver, which then provides increased quantities of acetyl co -A in the liver cells for production of cholesterol. Therefore, to decrease the blood cholesterol concentration, it is equally important to
take a diet low in saturated fat as to maintain a diet low in cholesterol concentration. (Guyton, C. 1976)

During muscular exercise, plasma level of poorly diffusible molecules increases about ten percent as a result of fall plasma water content. This effect must be taken into account in evaluating effects of exercise on lipoprotein levels as well as on molecules which are protein bound such as FFA. As a result of exercise, the levels of plasma triglycerides and very low density lipoprotein remain steady or fall only slightly in fasting subjects during exercise for two hours at load up to 400 kg.M / minute. With more prolonged and heavier exercise their levels fall consistently. Recent research has shown that exercise not only lowers total blood cholesterol, but also increases the fraction of cholesterol known as high density lipoprotein (HDL) and decreases the low density lipoproteins (LDL) fractions. HDL cholesterol is thought to protective against coronary heart disease whereas LDL is not.

All kinds of cholesterol considered to be risk factors. In fact, the high density lipoprotein cholesterol (HDL) fraction is thought to be protective against coronary heart disease. Regular exercise programmes have been shown to increase the HDL fraction. One of the reasons why HDL is not harmful is that they do collect or adhere to the inner linings of arteries. In fact, they actually help to break down the fatty deposits already present. The fatty atherosclerotic deposits are composed of low density (LDL) and very low density (VLDL) lipoprotein cholesterol fractions. Therefore, an overall low cholesterol level, with low LDL and VLDL fractions plus a high HDL fraction, appears to be healthy balance with respect to blood cholesterol. (Fox, E. L. & Mathews, D. K. 1981)

Regular yogic practices & exercises are cause of many changes in body and mind, the sum of which is known as the training effect.
'Understanding the change that results from yogic practices and exercise will help you to evaluate your training programme.

The primary adaptation to aerobic exercise is improved delivery of oxygen to the muscles. This is accomplished because of change in the blood and heart. Training increase blood volume and raise the level of R.B.C.

The recent research has shown that exercise not only lower total blood cholesterol, but increases the fraction of cholesterol known as high density lipoprotein(HDL) and decreases the low density lipoproteins (LDL) fractions. HDL cholesterol is thought to be protective against heart disease; where as LDL is not. (Penny, C. D. 1982; Krebs et, al. 1983; Surter, E & Hawes, M. R. 1993).

Krishanan, A. (1991) made a study, effect of selected yogic exercises and bhartiyam exercises on physiological variables among school boys observed that due to selected bhartiyma exercise and yogic practice pulse rate was decreased significantly and breath holding time, cardiovascular efficiency and vital capacity improved significantly.

Yogic practices and physical exercises are essential for the development of wholesome personality of the child that would depend upon the opportunity provided for wholesome development of the mental, physical, social, and spiritual aspects. Hence a well organized and properly administered physical education programme for school children is very essential to improve the physiological variables. This is because of various physiological systems in our body such as nervous system, circulatory system; glandular system, muscular system etc. become slowly conditioned to maintain harmony with each other by these practices which ultimately lead to stability of body and mind. An attempt is made in this study to have a searching inquiry by way of comparing the
effects of physical exercises, yogic practices, independently and also jointly on selected physiological variables on school boys in between 15 to 17 years of age. The subjects thus would be subjected to certain yogic practices including specific asanas, Pranayama and kriya for a period of three months. Further they also would be subjected to specially designed exercises programme for the same period. Finally it is aimed to find out which of the experimental programme is comparatively more effective on the selected physiological variables of the study.

**Statement of the Problem**

The purpose of this study was to investigate the Effect of exercises and certain yogic practices on selected physiological variables.

**Hypothesis**

Keeping in view the objectives of the study following hypothesis were formulated –

1. It was hypothesised that yogic practices (Asana and pranayama, Kriya) will have a more positive effect than Exercises on the physiological variables.

2. It was further hypothesised that a combined exercise yogic programme would be more effective in improving the selected physiological variables of the study than the individual programme of yoga and exercise.
Definition and Explanation of Terms

Asana:-

Gore, M.M. (1984) - The Asanas can only be defined as the “postural pattern” one has to achieve this pattern slowly. Maintain for some time steadily and to release it again in a slow and smooth manner.

Exercise:-

The word ‘Exercise’ seems to be composed of ‘ex’ the component derived from ‘arcer’ meaning to ‘lock’. Thus, ‘exercise’ means to unlock or to free a part to move.

Exercise is physical activity undertaken to develop, maintain or improve physical fitness. (wikipedia.org.)

Pranayama:-


“Tasminsati Svasprasavasayurgati Vicchedah Pranayamah” (P.Y.S.II.49).

The meaning is that the pause, brought in the movement of inhalation and exhalation, is nothing but pranayama.

Kapalbhati:-

When inhalation and exhalation are performed very quickly like a pair of bellows of a black smith. It dresses up all the disorders from the excess of phlegm, and is known as kapalbhati. kapal means “skull” and bhati means “light”(Hatha yoga pradipika 77)

Literally kapalbhati means an exercise that makes the forehead shining. It is one of the six cleansing processes described by hata yoga as shatkriyas. This purifications process involves the breathing apparatus nasal passage do them effectively.
Vital-Capacity:-

Jack, H. W. and David, L. C. (1944). Vital capacity as the amount of air that can be expelled after maximum inspiration.

“The maximal volume of gas that can be expelled from the lungs following the maximal inspiration is called vital capacity” (Jonas: Mosby's Dictionary of Complementary and Alternative Medicine. 2005, Elsevier.)

Breath holding Capacity:-

Moses, R. (1972), Breath holding capacity is the time duration through which one can hold his breath without inhaling or exhaling.

Air Flow Rate:-

The basis of peak respiratory flow for monitoring the ventilatory function is the amount of air and maximum rate of flow during a expiration followed by a deepest possible inspiration (Saraswat S.L. 1992).

The greatest rate of airflow that can be achieved during forced expiration, beginning with the lungs fully inflated, also called peak expiratory flow rate. (Mosby's Medical Dictionary, 2009).

Resting Heart Rate:-

Bert, C. H. and Taylor, N. B. (1972). Resting heart rate is pressure change transmitted as a wave through the arterial wall and blood column to the periphery while the person at rest.

Jack, H. W. and David, L. C. (1944). Stated that the heart rate reflects the increased demands of the body when engaged in activity. Resting heart rate is the heart rate which is made only under condition of total relaxation, such as early morning.

Respiratory rate:-

“Number of beats taken in a minute or number of inspiration\expiration in a minute”.

(19)
Cardio-Vascular Endurance:-

Cardio-vascular endurance is one of the most significant components of general physical fitness and is measured by testing one’s aerobic capacity.

It may be defined as the ability of the heart and lungs to take in and transport adequate amounts of oxygen to the working muscles, for activities that involve large muscles masses to be performed over long periods of time for example running. Swimming, and bicycling activities involve large muscles. (Fox. et. al. 1988)

Cardio vascular endurance has many synonyms like cardio-respiratory endurance, Circulatory- respiratory endurance, and cardio-pulmonary endurance.

Blood Pressure:-

Blood pressure is the pressure of the blood against the walls of the arteries “blood pressure result from two forces, one is created by the heart as it pumps blood in to the arteries and through the circulatory system (systolic) the other is the forces of the arteries as they resist the blood flow (diastolic”).

Systolic blood pressure:-

The higher (systolic) number represents the pressure with the heart contracts to pumps blood to the body. (Yoga Point)

Diastolic blood pressure:-

The lower (diastolic) number represents the pressure when the heart relaxes between beats. (Yoga Point)

Blood sugar:-

The main sugar that the body makes from the food in the diet, Glucose is carried through the bloodstream to provide energy to all cells in the body. Cells cannot use glucose without the help of insulin. (MedicineNet.com)
Hematology:-
A branch of biology that deals with the study of blood and blood forming organs, or The science dealing with their morphology of blood and blood-forming tissues and their physiology and pathology.

Red blood cells:-
Red blood cells are the type of cells in the blood that are responsible for delivering oxygen from the lungs to the rest of the body, they are also called Erythrocytes. (Lynne Eldridge MD)

Leukocytes (W.B.C.):-
A group of colorless blood corpuscles capable of amoeboid movement, The chief function of which is to protect the body against microorganisms causing disease and which may be classified into two main groups (granular and nongranular). (Guyton, C. 1991)

Platelets:-
Platelets are the smallest structural units in the blood. They are formed in the bone marrow from the cytoplasm of the giant cells known as megakaryocytes. (Guyton, C. 1991)

Serum Cholesterol:-
It is a chemical produced in the body by the break down of fats. It is important in body metabolism and is necessary for the formation of various hormones.

High- density lipoprotein:-
A lipoprotein that transport cholesterol in the blood, composed of high proportion of protein and relatively little cholesterol, high levels are thought to be associated with decreased risk of coronary heart disease and atherosclerosis. (The free dictionary.com)
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**Low-density lipoprotein:**

Low-density lipoprotein cholesterol is the fraction of total cholesterol that accumulates as fat deposits (plaques) on arterial walls.

**Significance of the Study**

The Study has been done on yogic practices and exercises to see to the impact on the selected physiological variables, the present study will highlight this aspect and will help the sports trained in adapting best method and also for the population for developing the physiological efficiency, health and physical fitness that may help in enhancing performances in all aspects of human being. The present study also will be significance in.

This study will make a significant contribution to enrich the existing knowledge of yoga and exercises.

The study will have some worth for remedial, curative and rehabilitative programme for those who suffering from various physiological problems.

This study will be helpful to know the effect of yoga and exercise in improving physiological variables of individual.

The study will be helpful for the teachers of physical education and coaches through informing them of the importance of yogic and exercises efficiency in enhancing the physiological factors related with sports performance.

The study will also be helpful in establishing the relationship between physiological and haematological variables of this age group of students and subsequently in establishing the effects of Yoga and exercises on the various fitness and health aspects.