CHAPTER - I

INTRODUCTION

1.1 YOGA

Yoga is an ancient Indian practice that aims at rehabilitating and reinforcing a balance between the body, mind, and spirit. Used as a complementary practice alongside allopathic treatment, it can help individual's cope and live with muscular dystrophy. Incorporating Static and Dynamics of yoga practices can help ease the conditions of muscular dystrophy and greatly improve the quality of life. Muscular dystrophy yoga uses a series of gentle and easy movements in combination with deep breathing techniques to improve muscle tone and reduce pain. **(Werner, 1999)**

1.2 ORIGIN OF YOGA

Yoga the very word radiates peace and tranquility. The word Yoga is derived from the Sanskrit word 'Yuj' which essentially means to join or unite. The union referred to is that of the individual self-uniting with Cosmic Consciousness or the Universal Spirit. Yoga is a means to achieving this goal. Born in India, almost 26,000 years ago, Yoga is believed to have evolved during the period of the 'Sat Yuga', also called the Golden age. This period became known as a time of everlasting peace and abundant blessings, filled with seekers of the Eternal Truth. It was not until the discovery of the Indus- valley civilization, the largest civilization that knowledge about the origin of Yoga surfaced. Excavations give evidence of yoga's existence during this period; yogi -like figures engraved on soapstone seals have been unearthed. In fact, it was the Aryans, migrating from the north- west, who were instrumental in discovering yoga The purpose of yoga (meaning to bind) was called the 'raising of Mother Kundalini (the life force at the base of the spine). Yoga had its origins in India in the Sat Yuga, the Age of Gold, over 26,000 years ago. This was a long peaceful age of abundance in which humans had plenty of time to search within. The yoga of the raising of the Kundalini at this time blossomed organically, out of the intuition and spontaneity of the practitioner. The goal of the yogi was to ascend into the immortal realms of pure spirit, to imbibe the intuitional nectar of enlightenment, eradicate disease

and find liberation from suffering. This was called Samadhi. In 600 B.C., during the dark age of Kali Yug, signified by Iron, these practices were written down for the first time by Patanjali in India and thus gained a structure that evolved into various systems given out by contemporary Gurus. This structure was called the Eight Limbs of Patanjali's Yoga.

Ultimately, the students of yoga were to gain enough systematic knowledge of yoga techniques that they could tap into the original or primal yoga of spontaneity, intuition, and creative freedom, a condition that modern yogic practitioners might refer to as Super-mind. The seed mantra of yoga is AUM or OM. It is the sound of the Cosmos and is the sound that constitutes the Akashic Realms (the non-material ethylic plane), the source of Samadhi. This universal tone of pure resonance is produced elegantly by the disc-shaped instrument called the Ancient Gong OM is the combined resonant tone of Life Force that fills the Infinite Living Universe. ONG is that tone impinging on Matter, creating the physical Universe which resonates like a gong from atom to galaxy. A Gong is a cosmic engine of power and is appropriately named after the sound that it makes. It is an instrument that releases this all powerful OM resonance which, although constituting all materiality, is not limited to finite manifestation. It produces Holistic Tones which have 'fullness' and to which the whole being responds. By playing our body, mind and emotions as an organic gong, we are lead to the OM power of our Greater Self.

One of the beauties of the physical practice of yoga is that the poses support and sustain us no matter how old or young. As our age, our understanding of asana becomes more sophisticated. On move from working on the external alignment and mechanics of the pose to refining the inner actions to finally just being in the asana. Yoga has never been alien to us. We have been doing it since we were a baby. Whether it is the Cat Stretch that strengthens the spine or the Wind-Relieving pose that boosts digestion, you will always find infants doing some form of yoga throughout the day. Yoga can be many things to many people. We are determined to help to discover our “Yoga Way of Life!” The ultimate goal of Yoga is moksha (liberation), though the exact definition of what form this takes depends on the philosophical or theological system with which it is conjugated.

1.3 SURYA NAMASKAR

Surya Namaskara also known in English as Sun Salutation is a common sequence of asanas. Its origins lie in India where its large Hindu population worships Surya, the Hindu solar deity. This sequence of movements and asanas can be practiced on varying levels of awareness, ranging from that of physical exercise in various styles, to a complete sadhana which incorporates asana, pranayama, mantra and chakra meditation. It is often the beginning vinyasa within a longer yoga series. Sūrya Namaskara may also refer to other styles of "Salutations to the Sun". The Sun Salutation is regularly practiced in many Indian schools. The Hatha Yoga Pradipika, the oldest known hatha yoga text does not mention "Sun Salutations" but mentions a sūrya-bhedana (sun-piercing) kumbhaka (II, 44 and 48-50) while the Gheraṇḍa Saṁhitā mentions sūrya-bheda kumbhaka (58-59). The oldest documented book with clear depictions of asanas is the Sritattvanidhi, though there is no mention of "Sun Salutations" in the text, it does describe the asanas "Sarpasana" (Bhujangasana), "Gajasana" (Adhomukh Swannasan), "Uttanasana" and series of asanas done in tandem, similar to Sūrya Namaskāra

Surya Namaskara, like most asanas, is recommended to be performed on an empty stomach. Therefore some recommend a gap of at least two hours after eating and before performing the namaskara. It is generally practiced in the morning before breakfast or in evening. Shavasana is practiced at the end of practice for rest. Pranayama is synchronized with asanas. Mantras can be pronounced at the start of each Surya namaskara. Bījas(seeds) or the 12 mantras specific to each asana can also be chanted while performing each asana. The 12 specific mantras, though, repeated mentally instead. Chakras are points-of-focus, when performing asanas. There are a total of 8 different asanas in the sequence of the 12 asana changes of Surya namaskara. Some asanas are repeated twice in the same cycle of a Surya Namaskara. In a traditional Hindu context, Surya Namaskara is performed facing in the direction of the rising (east) or setting (west) sun. According to the scriptures one who performs the Surya Namaskaras daily does not get poor in a thousand births. There are 5 ways in which breathing should be done during Surya Namaskar.

Step	Asana	Breath	Chakra	Position
1	Pranamasana	Exhale	Anahata	Heart
2	Hasta Uttanasana	Inhale	Vishuddhi	Throat
3	Hastapaadasana	Exhale	Swadhisthana	Sacrum
4	Aekpaadprasarnaasana (one foot back, lift head, hands often on earth)	Inhale	Ajna	Third eye
5	Adho Mukha Svanasana /parvatasana	Exhale	Vishuddhi	Throat
6	Ashtanga Namaskara	Suspend	Manipura	Solar plexus
7	Bhujangasana	Inhale	Swadhisthana	Sacrum
8	Adho Mukha Svanasana	Exhale	Vishuddhi	Throat
9	Ashwa Sanchalanasana(opposite foot forward from 4, hands often on earth)	Inhale	Ajna	Third eye
10	Uttanasana	Exhale	Swadhisthana	Sacrum
11	Hasta Uttanasana	Inhale	Vishuddhi	Throat
12	Pranamasana	Exhale	Anahata	Heart

1.4 HATHA YOGA

The earliest references to hatha yoga are in Buddhist works dating from the eighth century. The earliest definition of hatha yoga is found in the 11th century Buddhist text Vimalaprabha, which defines it in relation to the center channel, bindu etcetera. The basic tenets of Hatha yoga were formulated by Shaiva ascetics Matsyendranath and Gorakshanath c. 900 CE. Hatha yoga synthesizes elements of Patanjali's Yoga Sutras with posture and breathing exercises. Hatha yoga, sometimes referred to as the "psychophysical yoga", was further elaborated by Yogi Swatmarama,

compiler of the Hatha Yoga Pradipika in 15th century. This yoga differs substantially from the Raja yoga of Patanjali in that it focuses on shatkarma, the purification of the physical body as leading to the purification of the mind (ha), and prana, or vital energy (tha). Compared to the seated asana, or sitting meditation posture, of Patanjali's Raja yoga, it marks the development of asanas (plural) into the full body 'postures' now in popular usage and, along with its many modern variations, is the style that many people associate with the word yoga today. It is similar to a diving board preparing the body for purification, so that it may be ready to receive higher techniques of meditation. The word "Hatha" comes from "Ha" which means Sun, and "Tha" which means Moon **(Mallinson. J, 2011)**

Hatha yoga, also called hatha vidyā, is a kind of yoga focusing on physical and mental strength building exercises and postures described primarily in three texts of Hinduism:

1. Hatha Yoga Pradipika, Svātmārāma (15th century)
2. Shiva Samhita, author unknown (1500 or late 17th century)
3. Gheranda Samhita by Gheranda (late 17th century)

Many scholars also include the preceding Goraksha Samhita authored by Gorakshanath of the 11th century in the above list. Gorakshanath is widely considered to have been responsible for popularizing hatha yoga as we know it today. Vajrayana Buddhism, founded by the Indian Mahasiddhas, has a series of asanas and pranayamas, such as tummo (Sanskrit caṇḍālī) and trul khor which parallel hatha yoga.

The main objective of Hatha Yoga is to promote balance between physical (pingala nadi) and mental-emotional energy (ida nadi).One of the leading authorities in Hatha Yoga, Swami Swatmarama, wrote the "Hatha Yoga Pradipika" (Light on Yoga) in Sanskrit. "Asana is spoken of as the first part of Hatha Yoga. It should be practiced for gaining steadiness of the body and mind, freedom from disease and lightness of the body." (Hatha Yoga Pradipika 1:17). Out of several thousands of asanas that originally existed, only around one hundred of the most prevalent are taught today. Out of those, some are dynamic and others static.

1.4.1 Dynamic Asanas

Dynamic Asanas involve active movement of the body. They affect the skeletal and muscular system and are aimed at developing flexibility. They stretch and tone the muscles, increase the flexibility of the joints and release energy blockages. They improve the function of the digestive and excretory systems, strengthen the lungs, remove stagnant blood from various parts of the body, and improve circulation. Dynamic asanas are particularly useful for beginners **(Gilbert NG, 2009).**

1.4.2 Static Asanas

Static asanas involve holding a pose for several minutes, and encourage deep, rhythmic breathing. These asanas affect the physical, pranic (vital energy) and mental aspects of being. They gently massage the internal organs and glands, which in turn regulates the release of hormones, and invigorates and relaxes the nervous system. They bring inner peace and prepare the practitioner for more advanced yoga practices, such as meditation. Static asanas are more suitable **(Gilbert NG, 2009).**

1.5 PUBERTY

Puberty refers to the transition in life from being a girl into becoming a woman. It marks the inception of sexual maturity and a body which is capable of reproduction, marked by changes like breast development and menstruation. Girls attain reproductive maturity four years after the first physical changes of puberty appear. Between the ages of 10 and 14 most boys and girls begin to notice changes taking place in their bodies. These changes, which occur over a number of years, are generally referred to as puberty. The changes take place in all boys and girls but they will start at different times and take place at different rates. Not everyone starts puberty between the ages of 10 and 14, some people start younger, and some much later. Similarly, in some people all the changes take place in two years, and in others they can take as long as four years. Generally they start between ages 7 and 13 in girls and ages 9 and 15 in boys **(Kail, RV and Cavanaugh JC, 2010).**

Puberty starts when extra amounts of chemicals called hormones start to be produced in the body. These hormones guide the changes that take place in the body. As well as causing physical changes these hormones also cause emotional changes. Puberty starts when extra amounts of chemicals called hormones are produced in the

body. In girls, a hormone called estrogen guides the changes that take place in the body. Puberty is the process of physical changes through which a child's body matures into an adult body capable of sexual reproduction to enable fertilization. It is initiated by hormonal signals from the brain to the gonads: the ovaries in a girl, the testes in a boy. In response to the signals, the gonads produce hormones that stimulate libido and the growth, function, and transformation of the brain, bones, muscle, blood, skin, hair, breasts, and sex organs. Physical growth height and weight accelerates in the first half of puberty and is completed when the child has developed an adult body. Until the maturation of their reproductive capabilities, the pre-pubertal physical differences between boys and girls are the external sex organs.

On average, girls begin puberty at ages 10–11; boys at ages 11–12. Girls usually complete puberty by ages 15–17, while boys usually complete puberty by ages 16–17. The major landmark of puberty for females is menarche, the onset of menstruation, which occurs on average between ages 12–13; for males, it is the first ejaculation, which occurs on average at age 13. In the 21st century, the average age at which children, especially girls, reach puberty is lower compared to the 19th century, when it was 15 for girls and 16 for boys. This can be due to any number of factors, including improved nutrition resulting in rapid body growth, increased weight and fat deposition, or exposure to endocrine disruptors such as xenoestrogens, which can at times be due to food consumption or other environmental factors. Puberty which starts earlier than usual is known as precocious puberty. Puberty which starts later than usual is known as delayed puberty.

Notable among the morphologic changes in size, shape, composition, and functioning of the pubertal body, is the development of secondary sex characteristics, the "filling in" of the child's body; from girl to woman, from boy to man. Derived from the Latin puberatum (age of maturity), the word puberty describes the physical changes to sexual maturation, not the psychosocial and cultural maturation denoted by the term adolescent development in Western culture, wherein adolescence is the period of mental transition from childhood to adulthood, which overlaps much of the body's period of puberty.

1.5.1 Pubertal Development

Adolescence is one of the most fascinating and complex transitions in the life span. Its breathtaking pace of growth and change is second only to that of infancy. Biological processes drive many aspects of this growth and development, with the onset of puberty marking the passage from childhood to adolescence. Puberty is a transitional period between childhood and adulthood, during which a growth spurt occurs, secondary sexual characteristics appear, fertility is achieved, and profound psychological changes take place. Although the sequence of pubertal changes is relatively predictable, their timing is extremely variable. The normal range of onset is ages 8 to 14 in females and ages 9 to 15 in males, with girls generally experiencing physiological growth characteristic of the onset of puberty two years before boys. Pubertal maturation is controlled largely by complex interactions among the brain, the pituitary gland, and the gonads, which in turn interact with environment (i.e., the social, cultural, and ambient environment). A relatively new area of research related to puberty is that of brain development. Evidence now suggests that brain growth continues into adolescence, including the proliferation of the support cells, which nourish the neurons, and myelination, which permits faster neural processing. These changes in the brain are likely to stimulate cognitive growth and development, including the capacity for abstract reasoning.

1.5.2 Changes in Girls During Puberty

Puberty can be a confusing time for preteen and teen girls. Learn about all the changes in girls during puberty from breast growth, to pubic hair, to self-esteem, peer pressure, acne and much more.

1.5.2.1 Hormones

Hormones play a key role in development during puberty. Learn how they work to bring about specific changes during the teen years.

1.5.2.2 Growth Spurt

Female Growth Spurt is an exciting event that happens during puberty. Learn how why it happens and what you can expect when it does.

1.5.2.3 Teen Acne

Teen acne can be an unpredictable and frustrating part of puberty. Learn all about acne and how to treat it.

1.5.2.4 Menstruation

Menstruation is the shedding of the wall of the uterus and starts at puberty. Get all the questions answered by a trusted friend and expert on female puberty.

1.5.2.5 Puberty Hair

Puberty hair refers to extra hair you develop on your body once your hormones signal the start of female puberty. The main areas that you will grow extra hair are on your vagina.

1.5.2.6 Irregular Menstrual Cycle

Having an Irregular Menstrual Cycle is common during female puberty. In some cases it may be caused by an underlying hormone imbalance or other medical problem. Educate yourself on what is normal

1.5.2.7 The Developmental Impact of Puberty

The biological changes associated with puberty are of special significance both to the young people themselves and to their community, but the ways these changes are interpreted and portrayed varies with cultural circumstances. Rites of Passage- In many societies, the transition to adolescence are recognized by ritual. These ceremonies are often public events that herald the contributions to society the young person is expected to make in his/her adult life. In some culture it has been found by the anthropologist, Margaret Mead, that girl's first menstruation is accompanied by spiritual rites that symbolized her emergence as a woman ready to become a productive member of the community.

1.5.2.8 Psychological responses to pubertal events

The events of puberty are rarely talked about publicly by the individuals who are experiencing them or by their community. Until fairly recently, when people recalled menarche or their first ejaculations it was often in negative or comic terms.

Both boys and girls are initially secretive about the onset of nocturnal emissions and menarche. In a study it has been found that girls' attitudes and beliefs about menstruation are only in part a result of their direct experience. In fact a girl's physical symptoms during menstruation are often correlated with the expectations she had before menarche. Girls who reported unpleasant symptoms were more likely to have been unprepared for menarche, to mature early and to be told about menstruation by someone they perceived negatively. Similarly the responses of boys to their first ejaculations depend on the context in which it occurs.

Physical changes that occur during puberty are usually marked by distinct stages of development known as Tanner stages. These were named after the child development expert, James Mourilyan Tanner, who first identified them. The Tanner stages give average dates of development, although there can be significant variation among children and teenagers. You should not worry if you reach a stage of puberty before or after your friends do.

1.5.2.9 Causes of Puberty

The onset of puberty is normally triggered by the hypothalamus which signals the pituitary gland to release hormones that stimulate the ovaries (in girls) or testicles (in boys) to secrete sex hormones. The hypothalamus and pituitary are small glands near the brain that secrete hormones. Although in most instances no cause is found for the condition but is some cases the following causes may be responsible for early onset of puberty:

Structural changes in the brain for example tumor, Brain injury, Infection, Disorders of the ovaries or testicles, Problems of the thyroid gland, Congenital adrenal hyperplasia, Hypothalamic hamartoma, McCune-Albright syndrome, Tumors that release a hormone called HCG.

1.5.2.10 Symptoms

Precocious puberty is if the following symptoms are seen in girls before the age of 8 years such as enlargement of penis and testicles, Development of underarm or pubic hair, Rapid growth in the height, Breast development, Onset of menstruation (menarche), Acne, and Maturation of outer genitals **(Illing. N, 1997).**

1.5.2.11 Clinical and social significance

Medical evaluation is sometimes necessary to recognize the few children with serious conditions from the majority who have entered puberty early but are still medically normal. Early sexual development warrants evaluation because it may:

1. Induce early bone maturation and reduce eventual adult height
2. Indicate the presence of a tumor or other serious problem Cause the child, particularly a girl, to become an object of adult sexual interest. Early puberty is believed to put girls at higher risk of sexual abuse, unrelated to pedophilia because the child has developed secondary sex characteristics.
3. Early puberty also puts girls at a higher risk for teasing or bullying, mental health disorders and short stature as adults.

Helping children control their weight is suggested to help delay puberty. Early puberty additionally puts girls at a "far greater" risk for breast cancer later in life. Girls as young as 8 are increasingly starting to menstruate, develop breasts and grow pubic and underarm hair; these "biological milestones" typically occurred only at 13 or older in decades past. Females of African ancestry are especially prone to early puberty. There are theories debating the trend of early puberty, but the exact causes are not known.

1.5.2.12 Diagnosing Early Puberty

There are two kinds of early puberty. The more common form is central precocious puberty. This is when the brain starts the normal process of puberty triggering the release of various hormones but does it early. In most cases, there is no known reason. Very rarely, central precocious puberty has a medical cause, like an infection or growth in the brain. Peripheral precocious puberty is less common. It usually develops when a problem with the ovaries or testicles like a cyst or a tumor triggers the release of the hormones estrogen or testosterone. To diagnose early puberty, your child's doctor will ask some questions and run some tests. They might include:

1. A physical exam, to evaluate any changes in the body.

2. A family history, to find out if early puberty might run in the family.
3. Blood tests, which check a child's hormone and sometimes thyroid levels.
4. X-rays, usually of the hand and wrist, to check a child's bone age. This is a way of seeing how quickly he or she is growing.
5. MRIs of the brain. These are sometimes used to rule out medical problems that could cause central precocious puberty, like tumors. MRIs are not routine for most kids. They're used when an underlying cause is more likely, as in children under 6 or kids with other symptoms.
6. Ultrasounds -- of the ovaries, for instance -- can be helpful in some cases.

1.5.2.13 Socio environmental

Social environmental is a term used to describe the general conduct exhibited by individuals within a society. It is essentially in response to what is deemed acceptable by a person's peer group or involves avoiding behavior that is characterized as unacceptable. This type of human behavior primarily determines how individuals interact with one another within a group or society. While social conduct is often modeled to create a comfortable social environment, anti-social behavior, such as aggression, scapegoating and group bullying, may also be defined as negative social behavior, particularly in instances where other individuals within a peer group all behave accordingly. Just as positive interactions among individuals in a society help create a pleasant environment for citizens, activities defined by peer groups to be acceptable, even if harmful to select individuals or subgroups within a society, are also part of social behavior. Studies of massive human violations have helped illustrate the extent by which harmful, but socially acceptable, behaviors have persisted in some societies. Examples of widespread acceptance of negative behavior within a peer group include historical incidents of mass genocide and human enslavement. With the use of specially designed behavior therapies and programs, doctors, educators and others can help individuals who are suffering from social disorders, such as shyness or unrestrained anger, learn how to overcome these issues to become more productive members of society. Not only is the study of how social conduct affects members of mainstream society important, but in studying anti-social behavior, in particular, mental health professionals are able to help people isolated from society become rehabilitated

and engage in positive interactions with others. Even when considering the prevalence of the dual inheritance theory, which attributes human behavior to a combination of genetic selection and cultural influence, social conduct programs may have a positive impact in correcting socially maladaptive behaviors in individual patients. Research within sociology and psychology have questioned whether traits, such as altruism, may be genetically influenced while, at the same time, be rooted in social psychology

Through the study of social psychology, it is known that humans are not the only beings influenced by social groups. Researchers studying animals and insects have found that social behavior governs the activities of these groups, as well. This is particularly evident in animals and insects that live their entire lives within a group of the same species and where each member has a role to play in that group's survival. As illustrated by the following examples of research findings, health outcomes are linked to multiple environmental factors.

1.5.2.14 Family

Adolescents who perceive that they have good communication and are bonded with an adult are less likely to engage in risky behaviors. Parents who provide supervision and are involved with their adolescents' activities are promoting a safe environment in which to explore opportunities. The children of families living in poverty are more likely to have health conditions and poorer health status, as well as less access to and utilization of health care.

1.5.2.15 School

Academic success and achievement are strong predictors of overall adult health outcomes. Proficient academic skills are associated with lower rates of risky behaviors and higher rates of healthy behaviors. High school graduation leads to lower rates of health problems and risk for incarceration, as well as enhanced financial stability during adulthood. The school social environment affects students' attendance, academic achievement, and behavior. A safe and healthy school environment promotes student engagement and protects against risky behaviors and dropping out.

1.5.2.16 Neighborhoods

Adolescents growing up in distressed neighborhoods characterized by concentrated poverty are at risk for a variety of negative outcomes, including poor physical and mental health, delinquency, and risky sexual behavior.

1.5.2.17 Media Exposure

Adolescents who are exposed to media portrayals of violence, sexual content, smoking, and drinking are at risk for adopting these behaviors.

1.6 BENEFITS OF YOGA FOR PRETEEN GIRLS

1.6.1 Get Strong

Yoga will tone the entire body. The postures work to strengthen the arms, the legs, the spine and the abdomen. Pre-teen girls will also see improvement in the sports they play, they will feel less pain lugging around a backpack full of books and they will totally be able to beat they brother up.

1.6.2 Get Flexible

Yoga will stretch out their entire body. It will lengthen their hamstrings, help release a tight lower back, and stretch out their hips. This makes sitting in their desk all day way more comfortable, it will help to stretch their out after an intense soccer game and will improve their posture.

1.6.3 Improves Sleep

Yoga helps to balance out their body and mind. Over time they will see that they sleep better; it is easier to fall asleep, stay asleep and wake up refreshed. Yoga helps to relax their body and mind which does miracles for stress and anxiety.

1.6.4 Healthier Eating

Yoga will change the way they look at food. They'll learn to really honour their body. They will want to put healthy, fresh, life giving food into their body versus sugary processed crap. After a great yoga practice they'll crave a fresh fruit and veggie's.

1.6.5 Clarity of Mind

We have thousands of thoughts per day and sometimes those thoughts get really negative. It is hard to know what feels right when their head won't shut up! Yoga gives them peace, it clears all the mental fog away and they will experience space and ease in their mind.

1.6.6 Respect for Your Body

This is a mega huge benefit of yoga especially for teen girls. Yoga teaches us to love our bodies. They will learn to really appreciate the body they have and all it can do for them. It creates confidence and builds self esteem through creating a strong relationship with their body.

1.6.7 Improves Mental Focus

Yoga teaches us about breathing deeply, quieting the mind and becoming present. Try taking 10 deep breaths with their eyes closed before a major test. When we tune into our breath and oxygenate our brain cells, we find quiet inside ourselves and deep focus and clarity ensues. It does wonders for the way we listen, think and act.

1.6.8 Opens their Heart

Yoga teaches us we are all one. Yoga reveals to us the beauty and vastness of our hearts. We learn compassion, self love, and how to listen to our innate wisdom. We see people differently when we connect with our hearts. We are kinder to ourselves and others.

1.6.9 Helps them out in an Emotional Time

Their yoga mat will hold their secrets, their tears, and their pain. Nobody can tell them how many times they have cried in a yoga class. The movement of the body and breath, the messages of the heart, the ritual of it all will provide them with strength and security. When they are going through a hard time, turn to their yoga practice for guidance.

1.6.10 Creates Community

Coming to a yoga class with other girls will show them that there are other girls just like them Teen girls that want to learn yoga, that wants to discover more about themselves. Girls that know what it's like to be insecure, shy, or are going through a rough time. It is the best thing ever when we can connect to likeminded people and support one another! One can tell them that their Yoga Girlfriends always accept me and love me just as they are. They don't judge me or knock me down. They can share with them their real and true self.

1.7 SEDENTARY BEHAVIOR

Sedentary behavior refers to any waking activity characterized by energy expenditure ≤ 1.5 metabolic equivalents and a sitting or reclining posture. In general this means that any time a person is sitting or lying down, they are engaging in sedentary behavior. Common sedentary behaviors include TV viewing, video game playing, computer use (collective termed "screen time"), driving automobiles, and reading **(Sedentary Behavior Research Network, 2012).**

Sedentary Behavior Research Network 2012: Standardized use of the terms "sedentary" and "sedentary behaviors". Recent evidence suggests that having a high level of sedentary behavior negatively impacts health independent of other factors including body weight, diet, and physical activity. For example, a 12-year study of 17,000 Canadian adults found that those who spent most of their time sitting were 50% more likely to die during the follow-up than those that sit the least, even after controlling for age, smoking, and physical activity levels. Given these and other findings, researchers are now studying the health impact of sedentary behavior in a wide range of academic domains including epidemiology, population health, psychology, ergonomics, engineering, and physiology.

1.8 PHYSICAL ACTIVITY

Physical activity is any body movement that works your muscles and requires more energy than resting. Walking, running, dancing, swimming, yoga, and gardening are a few examples of physical activity. According to the Department of Health and Human Services' "2008 Physical Activity Guidelines for Americans," physical activity generally refers to movement that enhances health. Exercise is a type of physical

activity that's planned and structured. Lifting weights, taking an aerobics class, and playing on a sports team are examples of exercise **(WHO, 2000).**

Physical activity is good for many parts of your body. This article focuses on the benefits of physical activity for your heart and lungs. The article also provides tips for getting started and staying active, and it discusses physical activity as part of a heart healthy lifestyle. Being physically active is one of the best ways to keep your heart and lungs healthy. Following a healthy diet and not smoking are other important ways to keep your heart and lungs healthy. Many Americans are not active enough. The good news, though, is that even modest amounts of physical activity are good for your health. The more active you are, the more you will benefit.

1.8.1 Types of Physical Activity

The four main types of physical activity are aerobic, muscle-strengthening, bone-strengthening, and stretching. Aerobic activity is the type that benefits your heart and lungs the most.

1.8.1.1 Aerobic Activity

Aerobic activity moves your large muscles, such as those in your arms and legs. Running, swimming, walking, bicycling, dancing, and doing jumping jacks are examples of aerobic activity. Aerobic activity also is called endurance activity. Aerobic activity makes your heart beat faster than usual. You also breathe harder during this type of activity. Over time, regular aerobic activity makes your heart and lungs stronger and able to work better.

1.8.1.2 Muscle-Strengthening Activity

The other types of physical activity muscle-strengthening, bone strengthening, and stretching benefit your body in other ways. Muscle-strengthening activities improve the strength, power, and endurance of your muscles. Doing pushups and situps, lifting weights, climbing stairs, and digging in the garden are examples of muscle-strengthening activities. With bone-strengthening activities, your feet, legs, or arms support your body's weight, and your muscles push against your bones. This helps make your bones strong. Running, walking, jumping rope, and lifting weights are examples of bone-strengthening activities.

Muscle-strengthening and bone-strengthening activities also can be aerobic, depending on whether they make your heart and lungs work harder than usual. For example, running is both an aerobic activity and a bone-strengthening activity. Stretching helps improve your flexibility and your ability to fully move your joints. Touching your toes, doing side stretches, and doing yoga exercises are examples of stretching.

Levels of Intensity in Aerobic Activity You can do aerobic activity with light, moderate, or vigorous intensity. Moderate- and vigorous-intensity aerobic activities are better for your heart than light-intensity activities. However, even light-intensity activities are better than no activity at all.

The level of intensity depends on how hard you have to work to do the activity. To do the same activity, people who are less fit usually have to work harder than people who are more fit. So, for example, what is light-intensity activity for one person may be moderate-intensity for another.

Light- and Moderate-Intensity Activities Light-intensity activities are common daily activities that don't require much effort. Moderate-intensity activities make your heart, lungs, and muscles work harder than light-intensity activities do. On a scale of 0 to 10, moderate-intensity activity is a 5 or 6 and produces noticeable increases in breathing and heart rate. A person doing moderate-intensity activity can talk but not sing.

Vigorous-Intensity Activities: Vigorous-intensity activities make your heart, lungs, and muscles work hard. On a scale of 0 to 10, vigorous-intensity activity is a 7 or 8. A person doing vigorous-intensity activity can't say more than a few words without stopping for a breath.

Examples of Aerobic Activities

1. Below are examples of aerobic activities. Depending on your level of fitness, they can be light, moderate, or vigorous in intensity:
2. Pushing a grocery cart around a store
3. Gardening, such as digging or hoeing that causes your heart rate to go up

4. Walking, hiking, jogging, running
5. Water aerobics or swimming laps
6. Bicycling, skateboarding, rollerblading, and jumping rope
7. Ballroom dancing and aerobic dancing
8. Tennis, soccer, hockey, and basketball

1.8.2 Benefits of Physical Activity

1. Physical activity has many health benefits. These benefits apply to people of all ages and races and both sexes. For example, physical activity helps you maintain a healthy weight and makes it easier to do daily tasks, such as climbing stairs and shopping.
2. Physically active adults are at lower risk for depression and declines in cognitive function as they get older. (Cognitive function includes thinking, learning, and judgment skills.) Physically active children and teens may have fewer symptoms of depression than their peers.
3. Physical activity also lowers your risk for many diseases, such as coronary heart disease (CHD), diabetes, and cancer.
4. Many studies have shown the clear benefits of physical activity for your heart and lungs.
5. Physical Activity Strengthens Your Heart and Improves Lung Function
6. When done regularly, moderate- and vigorous-intensity physical activity strengthens your heart muscle. This improves your heart's ability to pump blood to your lungs and throughout your body. As a result, more blood flows to your muscles, and oxygen levels in your blood rise.
7. Capillaries, your body's tiny blood vessels, also widen. This allows them to deliver more oxygen to your body and carry away waste products.
8. Physical Activity Reduces Coronary Heart Disease Risk Factors.

9. When done regularly, moderate- and vigorous-intensity aerobic activity can lower your risk for CHD. CHD is a condition in which a waxy substance called plaque (plak) builds up inside your coronary arteries. These arteries supply your heart muscle with oxygen-rich blood.

10. Plaque narrows the arteries and reduces blood flow to your heart muscle. Eventually, an area of plaque can rupture (break open). This causes a blood clot to form on the surface of the plaque.

11. If the clot becomes large enough, it can mostly or completely block blood flow through a coronary artery. Blocked blood flow to the heart muscle causes a heart attack.

12. Certain traits, conditions, or habits may raise your risk for CHD. Physical activity can help control some of these risk factors because it: Can lower blood pressure and triglyceride (tri-GLIS-er-ide) levels. Triglycerides are a type of fat in the blood. Can raise HDL cholesterol levels. HDL sometimes is called “good” cholesterol.

13. Helps your body manage blood sugar and insulin levels, which lowers your risk for type 2 diabetes.

14. Reduces levels of C-reactive protein (CRP) in your body. This protein is a sign of inflammation. High levels of CRP may suggest an increased risk for CHD.

15. Helps reduce overweight and obesity when combined with a reduced-calorie diet. Physical activity also helps you maintain a healthy weight over time once you have lost weight.

16. May help you quit smoking. Smoking is a major risk factor for CHD.

17. Inactive people are nearly twice as likely to develop CHD as people who are physically active. Studies suggest that inactivity is a major risk factor for CHD, just like high blood pressure, high blood cholesterol, and smoking.(**WHO, 2000**)

1.9 FAMILY COHESION

Family cohesion refers to the relationships and operational links between individuals who recognize each other as part of the same family unit. The avoidance of tensions and conflicts over a declining resource base, opportunities to observe and learn from nature, the ability to express cultural and spiritual values and the ability to participate in nature based activities is important to family cohesion. Social interactions between close friends and family members are critical to wellbeing, and are usually cited as the primary determinant of individual subjective wellbeing. In particular, interactions and the quality of the relationship with a partner can moderate the effect of negative events of life conditions and assist in maintaining a stable level of wellbeing. Outdoor recreation provides opportunities for shared experiences for families, groups of friends and communities. These shared experiences reinforce social bonds with family and friends and support social cohesion at the community level **(Olson, Russell, & Sprenkle, 1982).**

Family cohesion has been defined as the emotional bonding that family members have toward one another (Olson, Russell, & Sprenkle, 1982). Within Latino families, cohesion has been identified as a protective factor against external stressors (Hovey & King, 1996;Salgado de Snyder, 1987). The protective factor of family cohesion against distress has been considered a function of Latino families close knit relations, sharing sense of loyalty, reciprocity and solidarity among its members (Hovey & King, 1996). In general, a high level of perceived family cohesion and support has also been identified as the most distinctive dimension of Hispanic families (Sabogal, Marin, & Otero-Sabogal, 1987). Indeed, there is evidence that perceived social support from families is related to lower levels of psychological distress among Latino groups (Rivera, 2007; Vega, Kolody, Valle, & Weir, 1991). The strong emotional bonds measured by family cohesion are expected to promote family support.

1.9.1 Strengthening Family Cohesion

The Family cohesion enhances healthy family functioning by strengthening family cohesiveness. The entire Family Enrichment Weekend, from the moment the family is registered for the event, is focused on strengthening family cohesion. Family cohesion entails the emotional bonding family members have with one another (Olson, Russell, & Sprengkle 1984). Families who have healthy levels of cohesion emotionally

interact with one another and find balance that supports individual independence and family togetherness. Healthy family cohesion is not only a strength, but a resource for families that will assist them in facing the daily challenges of raising a child with autism, assisting in maintaining a healthy marriage, and in providing a nurturing environment for all the children in the family.

Family members from cohesive family environments feel included and emotionally connected with the family. Maintaining a cohesive family is difficult for the family who has a child with autism. The families become fragmented due to the high needs of the child with autism. The emotional bonding of the family as a unit is compromised and there is a loss of family togetherness. For families who have a child with a autism, family activities, including family outings, family meals, family holidays, are often unsuccessful, thereby compromising the development of healthy family cohesion. The most important goal of the Family Enrichment Weekend is to strengthen cohesion in each attending family. This inclusive, supportive environment contributes to successful family interactions and assists families in finding and maintaining cohesion. Throughout the Family Enrichment Weekend there are family activities specifically designed to increase cohesion and opportunities for family members to appreciate the talents of each family member. There is intensive assistance for each family in all activities, including family meals to ensure successful participation in a relaxed and accepting environment. The Family Enrichment Weekend gives families the opportunity to experience a model for maintaining and strengthening family cohesion. Some activities are planned within the Weekend where family members are together, other activities separate all or some of the family members. Children's play, game and dress-up activities separate them from their parents, and sometimes from one another if they are grouped by age. During these times parents participate in discussions built around their own educational and support needs. Mealtimes are always family times. When they come together at mealtime and for family activities there is the opportunity to share. The sharing is strategically planned where the children perform or show the parents what they did in their sessions. The closing event includes a video presentation of all the activities so that parents can see what their child was doing and the children can see what Mom and Dad were doing.

Attention to individual and family needs throughout the weekend, increases the emotional bonds among all family members. The activities and support are described

in detail in Parts 2 and 3 of this manual. For families to benefit fully and to strengthen family cohesion all family members must attend the event. This includes both parents, if both parents are in the home, and all the children living in the home. If one family member cannot be present it will compromise the value of the Family Enrichment Weekend for the family. In addition, all family members need to attend all the sessions. This is difficult for individuals who may be hesitant to participate in group sessions. Every effort is made to create a relationship with a staff person or another individual who will be attending to encourage participation. This is often done prior to the event so that the individual will be comfortable at the Family cohesion **(Olson, Russell & Sprenkle, 1982).**

1.10 EATING ATTITUDE

Food choice, like any complex human behavior, is influenced by many interrelated factors. The key driver for eating is of course hunger and satiety, but what we choose to eat is not determined solely by physiological or nutritional needs **(Johnson C, 1985).**

Other factors that influence our food choice are:

1. The sensory properties of foods, such as taste, smell or appearance.
2. Social, emotional and cognitive factors, such as likes and dislikes, knowledge and attitudes related to diet and health, habit or social context when eating condition our choice. Personal values, life experiences such as marital/co-habitation status, or skills (e.g. cooking), a person's beliefs (e.g. about issues like organic and GM), and perceptions, such as perceived barriers to eating a healthy diet, may be particularly important for certain individuals.
3. Cultural, religious and economic factors also constrain our choice. Education, ethnicity and availability, visibility or prices of products play a major role in our food choice.

This multitude of factors illustrates that “healthy eating”, which is the goal of public health campaigns, is only one of many considerations relevant to food choice.

Eating attitude evolves during the first years of life as biological and behavioral processes directed towards meeting requirements for health and growth. For the vast

majority of human history, food scarcity has constituted a major threat to survival, and human eating behavior and child feeding practices have evolved in response to this threat. Because infants are born into a wide variety of cultures and cuisines, they come equipped as young omnivores with a set of behavioral predispositions that allow them to learn to accept the foods made available to them. During historical conditions of scarcity, family life and resources were devoted to the procurement and preparation of foods, which are often low in energy, nutrients, and palatability. In sharp contrast, today in non-Third World countries children's eating habits develop under unprecedented conditions of dietary abundance, where palatable, inexpensive, ready-to-eat foods are readily available

What we eat affects how we feel. Food should make us feel good. It tastes great and nourishes our bodies. When eaten in too little or in excessive quantities, however, our health and appearance can be altered, which can create negative feelings toward food. By learning how to make better choices, you might be able to control compulsive eating, binging, and gaining weight. In addition to better appetite control, you might also experience feelings of calmness, high energy levels, or alertness from the foods you eat.

Experts believe there are many factors that can influence our feelings about food and our eating behaviors. These include:

1. Cultural factors
2. Evolutionary factors
3. Social factors
4. Familial factors
5. Individual factors

There also are positive and negative consequences associated with eating. For example, food might help you to cope with negative feelings in the short-term. In the long term, however, coping with stress by eating can actually increase negative feelings because you aren't actually coping with the problem causing the stress. Further, your self-image might become more negative as you gain weight.

1.11 DEHYDROEPIANDROSTERONE (DHEA)

Dehydroepiandrosterone (DHEA) is a hormone produced by the body's adrenal glands. These are glands just above the kidneys. DHEA supplements can be made from wild yam or soy. But they do know that it functions as a precursor to male and female sex hormones, including testosterone and estrogen. Precursors are substances that are converted by the body into a hormone. DHEA production peaks in the mid-20s. In most people, production gradually declines with age. Testosterone and estrogen production also generally declines with age. DHEA supplements can increase the level of these hormones. That's why a number of claims have been made about their potential health benefits **(Joseph Saling, 2014).**

Those claims range from benefits such as:

1. Building up the adrenal gland
2. Strengthening the immune system
3. Slowing natural changes in the body that come with age
4. Providing more energy
5. Improving mood and memory
6. Building up bone and muscle strength

Natural DHEA production is at its highest in the twenties: by the time we reach seventy we only make about 20% of the DHEA we had when we were young. A decline in DHEA with the passage of time is clearly what nature intended and as far as we know, a healthy process. This is only one of the major reasons we don’t recommend self-prescribing DHEA through over-the-counter products. Another reason is that DHEA is a very powerful precursor to all of your major sex hormones: estrogen, progesterone, and testosterone. (It’s molecular structure is closely related to testosterone). We call it the “mother hormone” the source that fuels the body’s metabolic pathway:

Besides DHEA, the adrenals also make the stress hormones cortisol and adrenaline. Adrenal exhaustion from coping with chronic stress from (among other things) poor nutrition, yo-yo dieting, emotional turmoil, and job-related stress means

your adrenals are bone-tired from pumping out cortisol and they simply can't manufacture enough DHEA to support a healthy hormonal balance. It's likely that DHEA and adrenal function are related to neurotransmitter-release rates, based on the mood elevation our patients report after just two weeks of adrenal support. But more research is needed to isolate the individual effects of DHEA from the hormones it gets metabolized into before we can know for sure what part it plays in all of this.

One thing we do know is that adequate levels of DHEA are needed to ensure your body can produce the hormones it needs when it needs them. In that balanced state your mood is stable and you feel clear-headed, joyful and vigorous. DHEA is the best "feel-good" hormone we know. And it works quickly and effectively when taken with the right combination of support. When DHEA levels are low, your body does not have enough working material for proper endocrine function. This throws off your hormone production and you feel a general sense of malaise, along with other symptoms of hormonal imbalance how severe depends on how many other demands are being made on your body at the same time. There is a growing body of evidence that healthy levels of DHEA may help stave off Alzheimer's disease, cancer, osteoporosis, depression, heart disease and obesity, but there is still no clear-cut consensus. There may be some increased risks associated with DHEA for women with a history of breast cancer all the more reason to take DHEA under medical supervision. At our practice we use DHEA where we've seen reliable proof of efficacy in cases of adrenal imbalance.

The lifestyle, diet and stress levels all contribute to the amount of DHEA the body can produce in a given period. At our practice we look first and foremost at adrenal function, using DHEA levels as one of several diagnostic tools. Think of our exhausted mother, Lisa. Like her, your adrenals work tirelessly to meet the demands placed on them until they are utterly tapped. Without adequate support, they spiral downward into adrenal imbalance and eventually adrenal exhaustion. Most of the women we see at our practice and I mean 99% have some indication of adrenal imbalance, including symptoms of low DHEA levels, such as:

1. Extreme fatigue
2. Decrease in muscle mass
3. Decrease in bone density

4. Depression
5. Aching joints
6. Loss of libido
7. Lowered immunity

Nowadays DHEA can be purchased over-the-counter as a matter of course in a confusing variety of doses and combinations. Most of these DHEA products are geared toward men, but more and more aimed at women. The labels claim DHEA will help us lose weight, rev up our libido, lift depression and give us back the strength, immunity, and stamina we had when we were 20 the age at which our bodies naturally produced the most DHEA. While on the surface this is appealing (who wouldn't want to feel 20 again?), it's obviously not what nature intended. We also don't know enough about DHEA to be conducting such a large, unregulated public experiment. DHEA is a potent steroid that's why it's been in the headlines and why it should be approached with due diligence. Without a comprehensive medical test it's impossible to know what DHEA levels are. Just because of getting older doesn't automatically mean deficient. Remember, this is a natural substance the bodies can produce more or less of it depending on the nutrient support, metabolism, hormonal balance, activity level and emotional state. In fact, there are many studies that show improvement in the DHEA levels naturally by maintaining a body mass index of 19-25, getting adequate rest and exposure to sunlight, exercising regularly (including sexual activity), and fostering more "downtime" in your life but more on that in a moment. Also remember that any time buy a supplement at a health food store, have no guarantee that what are buying is the real deal. There are few regulations in place to police the manufacturing process or the product itself. This is the reason we have formulated our own Women to Women supplements, made specifically for us by a manufacturer who tests every single batch. Many of the DHEA supplements at the local store have very high dosages way too high for most women. While there's no way to tell how much of that might actually absorb, especially unwise to experiment with DHEA at these levels without medical supervision.

Furthermore, taking DHEA alone won't do any good as adrenals are exhausted. There are too many other factors at work. To know the status of the adrenal function

and the other hormones before it can even begin to know what kind of combination of support the body needs.

1.12 LUTEINIZING HORMONE (LH)

Luteinizing hormone is produced by the pituitary gland and is one of the main hormones that control the reproductive system. Luteinizing hormone, like follicle stimulating hormone, is a gonadotrophin hormone produced and released by cells in the anterior pituitary gland. It is crucial in regulating the function of the testes in men and ovaries in women. In men, luteinizing hormone stimulates Leydig cells in the testes to produce testosterone, which acts locally to support sperm production. Testosterone also exerts effects all around the body to generate male characteristics such as increased muscle mass, enlargement of the larynx to generate a deep voice and the growth of facial and body hair. In women, luteinizing hormone carries out different roles in the two halves of the menstrual cycle. In weeks one to two of the cycle, luteinizing hormone is required to stimulate the ovarian follicles in the ovary to produce the female sex hormone, oestradiol. Around day 14 of the cycle, a surge in luteinizing hormone levels causes the ovarian follicle to tear and release a mature oocyte (egg) from the ovary, a process called ovulation. For the remainder of the cycle (weeks three to four), the remnants of the ovarian follicle form a corpus luteum. Luteinizing hormone stimulates the corpus luteum to produce progesterone which is required to support the early stages of pregnancy, if fertilization occurs **(Kaplan LA, 1996).**

The secretion of luteinizing hormone from the anterior pituitary gland is regulated through a system called the hypothalamic-pituitary-gonadal axis. Gonadotrophin-releasing hormone is released from the hypothalamus and binds to receptors in the anterior pituitary gland to stimulate both the synthesis and release of luteinizing hormone (and follicle stimulating hormone). The released luteinizing hormone is carried in the bloodstream where it binds to receptors in the testes and ovaries to regulate their hormone secretions and the production of sperm or eggs.

The release of hormones from the gonads can suppress the secretion of gonadotrophin-releasing hormone and, in turn, luteinizing hormone from the anterior pituitary gland. When levels of hormones from the gonads fall the reverse happens and gonadotrophin releasing hormone and hence luteinizing hormone rise. This is known as negative feedback. In men, testosterone exerts this negative feedback and in

women oestrogen and progesterone exert the same effect except at the midpoint in the menstrual cycle. At this point, high oestrogen secretions from the ovary stimulate a surge of luteinizing hormone from the pituitary gland, which triggers ovulation.

The fine tuning of luteinizing hormone release is vital to maintaining fertility. Because of this, compounds designed to mimic the actions of gonadotrophin-releasing hormone, luteinising hormone and follicle stimulating hormone are used to stimulate gonadal function in assisted conception techniques such as in vitro fertilization (IVF). Measuring the levels of luteinising hormone present in urine can be used to predict the timing of the luteinising hormone surge in women, and hence ovulation. This is one of the methods employed in ovulation prediction kits used by couples wishing to conceive.

Too much luteinising hormone can be an indication of infertility. Since the secretion of luteinising hormone is tightly controlled by the hypothalamic-pituitary-gonadal axis, high levels of luteinising hormone in the bloodstream can indicate decreased sex steroid production from the testes or ovaries (eg, as in premature ovarian failure). Polycystic ovary syndrome is a common condition in women associated with high levels of luteinising hormone and reduced fertility. In this condition, an imbalance between luteinising hormone and follicle stimulating hormone can stimulate inappropriate production of testosterone. Genetic conditions, such as Klinefelter's syndrome and Turner syndrome, can also result in high luteinising hormone levels. Klinefelter's syndrome is a male-only disorder and results from carrying an extra X chromosome (so that men have XXY, rather than XY chromosomes). As a result of this, the testes are small and do not secrete adequate levels of testosterone to support sperm production. Turner syndrome is a female-only disorder caused by a partial or full deletion of an X chromosome (so that women have XO, rather than XX). In affected patients, ovarian function is impaired and therefore luteinising hormone production increases to stimulate ovarian function.

Too little luteinising hormone will also result in infertility in both men and women, as a critical level of luteinising hormone is required to support testicular or ovarian function. In men, an example of a condition where low levels of luteinising hormone are found is Kallmann's syndrome, which is associated with a deficiency in

gonadotrophin-releasing hormone secretion from the hypothalamus. In women, a lack of luteinising hormone means that ovulation does not occur.

Luteinizing hormone (LH) is an important hormone both men and women produce. This hormone is known as a gonadotrophin, and it affects the sex organs in both men and women. For women, it affects ovaries, and in men, it affects the testes. LH plays a role in puberty, menstruation, and fertility. LH is a hormone that's produced in the pituitary gland. The pituitary gland is located at the base of the brain, and it's roughly the size of a pea. If you're a woman, LH is an important part of your menstrual cycle. It works with follicle-stimulating hormone (FSH), which another gonadotrophin made in the pituitary gland. FSH stimulates the ovarian follicle, causing an egg to grow. It also triggers the production of estrogen in the follicle. The rise in estrogen tells your pituitary gland to stop producing FSH and to start making more LH. The shift to LH causes the egg to be released from the ovary, a process called ovulation. In the empty follicle, cells proliferate, turning it into a corpus luteum. This structure releases progesterone, a hormone necessary to maintain pregnancy. If pregnancy doesn't occur, the levels of progesterone drop off and the cycle begins again. If you're a man, your pituitary gland also produces LH. The hormone binds to receptors in certain cells in your testes called Leydig cells. This leads to the release of testosterone, a hormone that's necessary for producing sperm cells.

Examples of instances when the doctor may order an LH blood test include:

1. A woman is having difficulty getting pregnant
2. A woman has irregular or absent menstrual periods
3. It's suspected that a woman has entered menopause
4. A man has signs of low testosterone levels, such as low muscle mass or decrease in sex drive.
5. A pituitary disorder is suspected.
6. A boy or girl appears to be entering puberty too late or too soon.

Increased levels of LH and FSH can indicate a problem with the ovaries. This is known as primary ovarian failure. Some causes of primary ovarian failure can include:

1. Ovaries that are not properly developed
2. Genetic abnormalities, such as Turner syndrome

3. Exposure to radiation
4. History of taking chemotherapy drugs
5. Autoimmune disorders
6. Ovarian tumor
7. Thyroid or adrenal disease
8. Polycystic ovary syndrome (PCOS)

Low levels of both LH and FSH can indicate secondary ovarian failure. This means another part of the body causes ovarian failure. In many cases, this is the result of problems with the areas of the brain that make hormones, such as the pituitary gland. If you're a man, high LH levels can indicate primary testicular failure. The causes of this condition can include:

1. Chromosome abnormalities, such as Klinefelter syndrome
2. Gonad development failure
3. A history of viral infections, such as the mumps
4. Trauma
5. Radiation exposure
6. History of taking chemotherapy medications
7. Autoimmune disorders
8. Tumors, such as a germ cell tumor

Secondary testicular failure can also be due to a brain-related cause, such as a disorder in the hypothalamus. Also, if your doctor has given you the GnRH shot and your LH levels went down or stayed the same, a pituitary disease is often to blame. For children, high levels of LH can cause early puberty. This is known as precocious puberty. According to the American Association of Clinical Chemistry (AACC), girls are more likely to experience this condition than boys. Underlying causes of this can include: **(Kaplan LA, 1996)**

1. A tumor in the central nervous system
2. Trauma or brain injury
3. Inflammation or infection in the central nervous system, such as meningitis or encephalitis

4. History of brain surgery

Delayed puberty with normal or lower LH levels can indicate underlying disorders, including:

1. Ovarian or testicular failure
2. Hormone deficiency
3. Turner syndrome
4. Klinefelter syndrome
5. Chronic infection
6. Cancer
7. An eating disorder

Testing LH has the potential to indicate a number of development- and fertility-related disorders. If your doctor suspects you may have a condition that affects the ovaries, testicles, or the parts of the brain that make LH, the test can provide more information.

1.13 GONADOTROPHIN-RELEASING HORMONE (GnRH)

Gonadotrophin-releasing hormone is produced and secreted by specialized nerve cells in the hypothalamus of the brain. It is released into tiny blood vessels that carry this hormone from the brain to the pituitary gland where it stimulates the production of two more hormones – follicle stimulating hormone and luteinizing hormone. These hormones are released into the general circulation and act on the testes and ovaries to initiate and maintain their reproductive functions. Follicle stimulating hormone and luteinizing hormone control the level of hormones produced by the testes and ovaries (such as testosterone, oestradiol and progesterone) and are important in controlling the production of sperm in men and the maturation and release of an egg during each menstrual cycle in women. During childhood, the levels of gonadotrophin-releasing hormone are extremely low, but as puberty approaches there is an increase in gonadotrophin-releasing hormone which triggers the onset of sexual maturation **(Sonis WA, 1986).**

No one really knows why this occurs, but it probably involves many different factors. When the ovaries and testes are fully functional, the production of gonadotrophin-releasing hormone, luteinizing hormone and follicle stimulating

hormone are controlled by the levels of testosterone (in men) and estrogens (example, oestradiol) and progesterone (in women). If the levels of these hormones rise, the production of gonadotrophin-releasing hormone decreases and vice versa. There is one exception to this rule; in women, at the midpoint of their menstrual cycle, oestradiol (produced by the follicle in the ovary that contains the dominant egg) reaches a critical high point. This stimulates a large increase in gonadotrophin-releasing hormone secretion and, consequently, a surge of luteinizing hormone which stimulates the release of a mature egg. This process is called ovulation.

It is not known what the effects are of having too much gonadotrophin-releasing hormone. Extremely rarely, pituitary adenomas (tumours) can develop, which increase production of gonadotrophins leading to overproduction of testosterone or oestrogen. A deficiency of gonadotrophin-releasing hormone in childhood means that the individual does not go through puberty. An example is a rare genetic syndrome known as Kallmann's syndrome which causes loss of the development of gonadotrophin-releasing hormone-producing nerve cells with a consequent loss of pubertal development and sexual maturation. It is more common in men than women and leads to loss of development of the testes or ovaries and infertility.

Any trauma or damage to the hypothalamus can also cause a loss of gonadotrophin-releasing hormone secretion which will stop the normal production of follicle stimulating hormone and luteinizing hormone causing loss of menstrual cycles (amenorrhoea) in women, loss of sperm production in men and loss of production of hormones from the testes and ovaries.

1.14 FOLLICLE STIMULATING HORMONE (FSH)

Follicle stimulating hormone is one of the gonadotrophin hormones, the other being luteinizing hormone. Both are released by the pituitary gland into the bloodstream. Follicle stimulating hormone is one of the hormones essential to pubertal development and the function of women's ovaries and men's testes. In women, this hormone stimulates the growth of ovarian follicles in the ovary before the release of an egg from one follicle at ovulation. It also increases oestradiol production. In men, follicle stimulating hormone acts on the Sertoli cells of the testes to stimulate sperm production (spermatogenesis) **(Nicole Galan RN, 2014).**

The production and release of follicle stimulating hormone is regulated by the levels of a number of circulating hormones released by the ovaries and testes. This system is called the hypothalamic-pituitary-gonadal axis. Gonadotrophin-releasing hormone is released from the hypothalamus and binds to receptors in the anterior pituitary gland to stimulate both the synthesis and release of follicle stimulating hormone and luteinising hormone. The released follicle stimulating hormone is carried in the bloodstream where it binds to receptors in the testes and ovaries. Using this mechanism follicle stimulating hormone, along with luteinising hormone, can control the functions of the testes and ovaries. In women, when hormone levels fall towards the end of the menstrual cycle, this is sensed by nerve cells in the hypothalamus. These cells produce more gonadotrophin-releasing hormone which in turn stimulates the pituitary gland to produce more follicle stimulating hormone and luteinising hormone and release these into the bloodstream. The rise in follicle stimulating hormone stimulates the growth of the follicle in the ovary. With this growth, the cells of the follicles produce increasing amount of oestradiol and inhibin. In turn, the production of these hormones is sensed by the hypothalamus and pituitary gland and less gonadotrophin-releasing hormone and follicle stimulating hormone will be released. However as the follicle matures, and more and more oestrogen is produced from the follicles, it simulates a surge in luteinising hormone and follicle stimulating hormone which stimulates the release of an egg from a mature follicle – ovulation.

Thus, during each menstrual cycle there is a rise in follicle stimulating hormone secretion in the first half of the cycle that stimulates follicular growth in the ovary. After ovulation the ruptured follicle forms acorpus luteum that produces high levels of progesterone. This inhibits the release of follicle stimulating hormone. Towards the end of the cycle the corpus luteum breaks down, progesterone production declines and the next menstrual cycle begins when follicle stimulating hormone starts to rise again.

In men, the production of follicle stimulating hormone is regulated by the circulating levels of testosterone and inhibin, both produced by the testes. Follicle stimulating hormone regulates testosterone levels and when these rise they are sensed by nerve cells in the hypothalamus so that gonadotrophin-releasing hormone secretion and consequently follicle stimulating hormone is decreased. The opposite occurs when testosterone levels decrease. This is known as a negative feedback control so that the

production of testosterone remains steady. The production of inhibin is also controlled in a similar way but this is sensed by cells in the anterior pituitary gland rather than the hypothalamus.

Most often, raised levels of follicle stimulating hormone are a sign of malfunction in the ovary or testis. If the gonads fail to create enough oestrogen, testosterone and/or inhibin, the correct feedback control of follicle stimulating hormone production from the pituitary gland is lost and the levels of both follicle stimulating hormone and luteinising hormone will rise. This condition is called hypergonadotrophic-hypogonadism, and is associated with primary ovarian failure or testicular failure. This is seen in conditions such as Kallmann's syndrome in men and Turner syndrome in women. In women, follicle stimulating hormone levels also start to rise naturally in women around the menopausal period, reflecting a reduction in function of the ovaries and decline of oestrogen and progesterone production. There are very rare pituitary conditions that can raise the levels of follicle stimulating hormone in the bloodstream. This overwhelms the normal negative feedback loop and can cause ovarian hyper stimulation syndrome in women. Symptoms of this include enlarging of the ovaries and a potentially dangerous accumulation of fluid in the abdomen (triggered by the rise in ovarian steroid output), which leads to pain in the pelvic area.

In women, a lack of follicle stimulating hormone leads to incomplete development at puberty and poor ovarian function (primary ovarian failure). In this situation ovarian follicles do not grow properly and do not release an egg, thus leading to infertility. Since levels of follicle stimulating hormone in the bloodstream are low, this condition is called hypogonadotrophic-hypogonadism. Sufficient follicle stimulating hormone action is also needed for proper sperm production. In the case of complete absence of follicle stimulating hormone in men, lack of puberty and infertility due to lack of sperm (azoospermia) can occur. Partial follicle stimulating hormone deficiency in men can cause delayed puberty and limited sperm production (oligozoospermia), but fathering a child may still be possible. If the loss of follicle stimulating hormone occurs after puberty, there will be a similar loss of fertility.

1.15 REASON FOR SELECTION OF THE TOPIC

In modern world Sedentary lifestyle or the lack of physical exercise, obesity and at times the cause can even be your genes. Parents should make sure to give balanced

nutritional diet to their children. Child should be on a healthy balanced diet, and that they are also getting enough physical exercise. Equip the girls with more awareness on how to behave around strangers and how to identify sex abuse, so they can prevent or report such incidents. A complete education on the female anatomy, puberty-related changes and sexuality would not be appropriate, because discussing these issues openly is not part of Indian culture.

The psycho physical form of practice will be the best remedy on solution for the puberty. Yoga is the only traditional of therapy accepted by the WHO. This is the very reason for choosing this topic for research.

1.16 REASONS FOR THE SELECTION OF THE VARIABLES

Puberty girls are facing more physical and emotional problems due to sudden hormonal changes and because of current life style and food habits and lack of exercises. Socio environmental variables and pubertal development dimensional variables are selected as dependent variables where Static Hatha Yoga Sadhana and Dynamic Hatha Yoga Sadhana are selected as independent variables.

1.17 STATEMENT OF THE PROBLEM

The purpose of the present study was to find out the effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development dimension among preteen girls.

1.18 HYPOTHESES

1. It was hypothesized that there would be a significant reduction in the Socio environmental dimensions namely ‘Sedentary behavior’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

2. It was hypothesized that there would be a better significant reduction in the Socio environmental dimensions namely ‘Sedentary behavior’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

3. It was hypothesized that there would be a significant improvement in the Socio environmental dimensions namely ‘Physical activity’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

4. It was hypothesized that there would be a better significant improvement in the Socio environmental dimensions namely ‘Physical activity’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

5. It was hypothesized that there would be a significant improvement in the Socio environmental dimensions namely ‘Family cohesion’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

6. It was hypothesized that there would be a better significant improvement in the Socio environmental dimensions namely ‘Family cohesion’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

7. It was hypothesized that there would be a significant improvement in the Socio environmental dimensions namely ‘Eating attitude’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

8. It was hypothesized that there would be a better significant improvement in the Socio environmental dimensions namely ‘Eating attitude’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

9. It was hypothesized that there would be a significant improvement in the Pubertal developmental dimensions namely ‘Dehydroepiandrosterone (DHEA)’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

10. It was hypothesized that there would be a better significant improvement in the Pubertal developmental dimensions namely ‘Dehydroepiandrosterone (DHEA)’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

11. It was hypothesized that there would be a significant reduction in the Pubertal developmental dimensions namely ‘Luteinizing hormone (LH)’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

12. It was hypothesized that there would be a better significant reduction in the Pubertal developmental dimensions namely ‘Luteinizing hormone (LH)’ Sedentary behavior due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

13. It was hypothesized that there would be a significant reduction in the Pubertal developmental dimensions namely ‘Gonadotrophin releasing hormone (GnRH)’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

14. It was hypothesized that there would be a better significant reduction in the Pubertal developmental dimensions namely ‘Gonadotrophin releasing hormone (GnRH)’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

15. It was hypothesized that there would be a significant reduction in the Pubertal developmental dimensions namely ‘Follicle stimulating hormone (FSH)’ due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

16. It was hypothesized that there would be a better significant reduction in the Pubertal developmental dimensions namely ‘Follicle stimulating hormone (FSH)’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

1.19 SIGNIFICANCE OF THE STUDY

The significance of the present study are as follows.

1. This study would be helpful for the society to understand the early pubertal complication.
2. This study would be helpful for improve the preteen girls.
3. This study would be helpful for medical professional and yoga therapists.
4. The study would be helpful for the further research on pubertal developments.

5. Having the socio environmental and pubertal development as the variables, the parents would to take steps to implement the strategy wherever necessary.

1.20 DELIMITATIONS

The present study was delimited into the following aspects.

1. The sample for the present study was delimited from to pubertal development preteen girls only from Chennai city.
2. The age of the subjects were ranging from 9 to 12 years.
3. The total numbers of subjects were 30 preteen girls, in which 10 for experimental group I (Static Hatha Yoga Sadhana), 10 for experimental group II (Dynamic Hatha Yoga Sadhana), and 10 for Control group were taken for the study.
4. The subjects were experimentally treated with Static and Dynamic Hatha Yoga Sadhana.
5. The study was conducted on dependent variables socio environmental dimensions such as Sedentary behavior, Physical activity, Family cohesion, Eating attitude, and pubertal developmental dimensions such as Dehydroepiandrosterone (DHEA) Test, Luteinizing hormone (LH) Test, Gonadotrophin releasing hormone (GnRH) Test, and Follicle stimulating hormone (FSH) Test.
6. The experimental period was fixed as 15 weeks and five days in a week between 7 am to 8 am.
7. The standardized as well modified tests were used to collect related data on the selected dependent variables.

1.21 LIMITATIONS

The limitations of the present study were as follows.

1. Allopathic Medication, food habits, rest period, life style etcetera could not be controlled.

2. Since the nature of disorder condition and limitation in subject availability, Geographical differences, Living standard, environment factors which might be influence on the data was not considered, during the period of testing.

3. The previous undertaken therapies and life supportive equipment's of the subjects in preteen girls, which might be influence on the data was not considered.

1.22 MEANING AND DEFINITION OF THE TERMS

1.22.1 YOGA

The term yoga comes from a Sanskrit word which means yoke or union. Traditionally, yoga is a method joining the individual self with the Divine, Universal Spirit, or Cosmic Consciousness. Physical and mental exercises are designed to help achieve this goal, also called self-transcendence or enlightenment **(Stuart Ray Sarbacker, 2005).**

1.22.2 PRANAYAMA

Pranayama is generally defined as breath control. the word pranayama is comprised of two roots: *prana* plus *ayama*. Prana means 'vital energy' or 'life force'. **(Swami Satyananda Saraswati, 1996)**

1.22.3 STATIC YOGA

Static Yoga is Hatha Yoga or Restorative Yoga – yoga that is more slower-paced, calm and peaceful. Static yoga is geared towards classical postures that improve balancing, strength and flexibility. This helps to stimulate the body's nervous system, which controls the functioning systems of the rest of the body such as the muscular, digestive, immune, respiratory and cardiovascular systems**. (Gilbert NG, 2009)**

1.22.4 DYNAMIC YOGA

Dynamic Yoga is Ashtanga, Power Yoga or Yoga Core – yoga that is fast-paced and energetic; providing the body with a good cardiovascular workout and enhancing blood circulation. This helps to improve one's lymphatic function which, in turn, builds

up the immune system and prevents one from being susceptible to illnesses. **(Gilbert NG, 2009)**

1.22.5 SOCIAL ENVIRONMENT

The social environment, social context, socio-cultural context or milieu refers to the immediate physical and social setting in which people live or in which something happens or develops. It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact. **(Elizabeth Barnett, Michele Casper, 2001)**

1.22.6 PUBERTY

Puberty is the process of physical changes through which a child's body matures into an adult body capable of sexual reproduction to enable fertilization. It is initiated by hormonal signals from the brain to the gonads: the ovaries in a girl, the testes in a boy. In response to the signals, the gonads produce hormones that stimulate libido and the growth, function, and transformation of the brain, bones, muscle, blood, skin, hair, breasts and sex organs. Physical growth height and weight accelerates in the first half of puberty and is completed when the child has developed an adult body. Until the maturation of their reproductive capabilities, the pre-pubertal physical differences between boys and girls are the external sex organs. On average, girls begin puberty at ages 10–11; boys at ages 11–12**. (Kail, RV and Cavanaugh JC, 2010)**

1.22.7 SEDENTARY BEHAVIOR

Sedentary behavior refers to any waking activity characterized by an energy expenditure ≤ 1.5 metabolic equivalents *and* a sitting or reclining posture. In general this means that any time a person is sitting or lying down, they are engaging in sedentary behavior. Common sedentary behaviors include TV viewing, video game playing, computer use (collective termed “screen time”), driving automobiles, and reading. **(Sedentary Behavior Research Network, 2012)**

1.22.8 PHYSICAL ACTIVITY

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure **(WHO, 2000).**

1.22.9 FAMILY COHESION

Family cohesion has been defined as the emotional bonding that family members have toward one another **(Olson, Russell & Sprenkle, 1982).**

1.22.10 EATING ATTITUDE

Definition of Eating attitude, based on "what, how, with what, with whom, where and when we eat, why we eat that, in which situation we eat, what we think and feel towards food. it is also important to ask in what are food choices based on, and where there is difficulty, lack of control, aversion, and what are the feelings related to food. **(Johnson C, 1985)**

1.22.11 FOLLICLE STIMULATING HORMONE (FSH)

Follicle Stimulating Hormone is a hormone released from the pituitary gland in the brain that stimulates an egg follicle to grow each month as part of the menstrual cycle. Elevated blood levels of FSH indicate ovarian maturing, as greater amounts of the hormone are required for the ovary to recruit and stimulate an egg follicle. **(Nicole Galan RN, 2014)**

1.22.12 LUTEINIZING HORMONE TEST (LH)

LH is a hormone secreted by the pituitary gland. It, along with FSH, helps a woman's egg mature and develop. There is a surge of LH right before ovulation that triggers the egg's release from the ovary, and this surge is what at-home ovulation predictor kits look for. In men, LH is involved in the production of testosterone, which in turn affects sperm cell growth and development **(Kaplan LA, 1996).**

1.22.13 GONADOTROPHIN-RELEASING HORMONE (GnRH)

A kind of fertility drug, GnRH agonists is artificial hormones that mimic the body’s natural hormone gonadotrophin-releasing hormone (GnRH). A GnRH agonist

first leads to a rapid increase in the production of the hormones FSH and LH. However, after this brief increase, the pituitary gland stops producing the hormones, preventing ovulation **(Sonis WA, 1986).**

1.22.14 DEHYDROEPIANDROSTERONE (DHEA)

Dehydroepiandrosterone (DHEA) is a hormone produced by your body's adrenal glands. These are glands just above your kidneys. it functions as a precursor to male and female sex hormones, including testosterone and estrogen. Precursors are substances that are converted by the body into a hormone **(Joseph Saling, 2014).**

CHAPTER - II

REVIEW OF RELATED LITERATURES

The phrase “Review of Literatures” consist of two words “review” and “Literature” in research mythology the term Literature refers to knowledge of a particular area of any discipline, which includes theoretical practical and it is research studies.

The literature in any field of forms the foundation upon which all further work knowledge provided by the review of literature one work will be build. If we fail to build foundation of knowledge provided by the review of literature one work to be shadow and that has already done better by someone else. The following literature is collected through book, magazines, and research quarterlies available in the library of Tamil Nadu Physical Education Sports University, Chennai and through internet of the related work would hold in finds the direction of study.

2.1 STUDIES ON PUBERTAL DEVELOPMENT

Kathleen Doheny (2010) conducted a study on the age of puberty is declining for girls, with more girls developing breasts by age 7 than in years past, according to a new study. In his purpose of the study was 1,239 girls, randomly selected 10% of whites, 23% of African-Americans, and 15% of Hispanic girls had breast development indicating onset of puberty by age 7, Biro found. Breast Development More Common than Reported was measured, Pretest was conducted before the experimental training and post test was conducted immediately after the experimental training. The experimental training of yogic practices was given for a period of 12 weeks. The experimental training consists of the researchers assessed the onset of puberty by a standard measurement of breast development. They found that 10.4% of white girls in the current study had breast development, compared to 5% in the 1997 study.23.4% of African-American girls had beat development, compared to 15.4% in the 1997 study. The collected data were analyzed using independent t test. The result of the study show that there was a significant improvement on Besides ethnicity, body mass index or BMI was found to play a role in onset of puberty, Biro's team found. Girls who had breast development at age 7 were more likely to have a higher BMI.

Saraswati Hunshal (2010) conducted a study on effect of pubertal development among school girls. To achieve the purpose of the study 384 school girls were selected from two urban and two rural schools from Dharwad and Khurda Districts of Karnataka and Orissa. Their age ranges between 9 and 15 years. The variables are Self-structured questionnaire was used for eliciting required information about physical growth, secondary sex characteristics and about menstruation. Pretest was conducted before the experimental training and post test was conducted immediately after the experimental training. The collected data were analyzed using independent t test. The information was collected by in depth personal interview and by referring to school records. Information about puberty milestone or secondary sexual characteristics was collected by using Tanner scale. The result of the study show that there was a significant results revealed that the development of all puberty milestones such as breast (B2), pubic hair (PH2), auxiliary hair development and menarche were found at earlier age among girls of both regions compared to Tanner's stages of pubertal development.

Boot AM, de Ridder MA (1997) Bone mineral density in children and adolescents: relation to puberty, calcium intake, and physical activity. The association of height, weight, pubertal stage, calcium intake, and physical activity with bone mineral density (BMD) was evaluated in 500 children and adolescents (205 boys and 295 girls), aged 4-20 yr. The BMD (grams per cm2) of lumbar spine and total body was measured with dual energy x-ray absorptiometry. Lumbar spine volumetric BMD was calculated to correct for bone size. BMD and volumetric BMD increased with age. During puberty, the age-dependent increment was higher. After adjustment for age, the Tanner stage was significantly associated with all three BMD variables in girls and with spinal BMD in boys. In boys, positive correlations were found between BMD and both calcium intake and physical activity after adjustment for age. Stepwise regression analysis with weight, height, Tanner stage, calcium intake, and physical activity as determinants with adjustment for age resulted in a model with Tanner stage in girls and weight in boys for all three BMD variables. The major independent determinant of BMD was the Tanner stage in girls and weight in boys.

Kerstin Albertson (1996) conducted a study on effect of Circadian Cortisol Rhythms in Healthy among Boys and Girls. The purposes of the study Group of 235 Healthy Children (162 Boys and 73 Girls) were selected from Sweden. The age range

was between 2.2–18.5 yr. The variables are Age, Growth, Body Composition, and Pubertal Development. Pretest was conducted before the experimental training and post test was conducted immediately after the experimental training. The experimental training consists of Serum cortisol was analyzed from venous blood samples taken at 1400, 1800, 2200, 0200, 0400, 0600, and 1000 h. Regardless of high or low mean diurnal cortisol levels, repeated measurements within and between pubertal stages indicated that an individual remains in his or her cortisol range throughout pubertal development. No evidence was found for differences in temporal placement or level of the circadian cortisol rhythm in relation to age, growth, or body composition. Despite This Variability between Individuals, There Is No Correlation between Cortisol Levels and Either Body Composition or Growth Rate.

Rankinen T (1995) Dietary intake and nutritional status of athletic and nonathletic children in early puberty. Dietary intakes, trace element status, and anthropometric measures were studied in 12- to 13-year-old boys (n = 49) playing ice hockey (AB) and in 11- to12-year-old girls who were gymnasts, figure skaters, and runners (AG; n = 43). Thirty-five boys (CB) and 53 girls (CG) not involved in supervised sports were controls. After adjustment for sexual maturation, ABs had larger upper arm muscle circumference than CBs. The sum of four skinfolds was smaller in AGs than in CGs. The intake of energy and all micronutrients examined was higher in ABs than in CBs. Micronutrient intakes were not different between AGs and CGs. Compared to CBs, serum ferritin and copper concentrations were lower, but serum zinc concentration was higher in ABs. No differences in trace element status were found between AGs and CGs. Blood investigations did not indicate inadequate trace element status in any of the groups studied.

Marin G et.al., (1994) The effects of estrogen priming and puberty on the growth hormone response to standardized treadmill exercise and arginine-insulin in normal girls and boys. To determine the effects of puberty and estrogen priming on the GH response to standardized treadmill exercise and arginine-insulin in normal boys and girls, we performed tests in 84 normal children (41 girls and 43 boys) representing all stages of puberty. A subset of the pre pubertal children received the tests twice, with or without the administration of ethinyl estradiol (40 micrograms/m2 daily) for 2 days before the tests. The peak GH response to the three tests increased significantly with pubertal stage ($r = 0.57$; $P < 0.0001$), but did not differ between boys and girls at the

same stage. With advancing puberty, the percentage of normal children who failed to attain a GH level greater than 7 micrograms/L during any of the three tests declined from 61% at pubertal stage 1 to 44% at stage 2, 11% at stage 3, and 0% at stages 4 and 5. Administration of estrogen to the pre pubertal subjects raised the normal range for the peak GH response to the three tests from 1.9-20.3 to 7.2-40.5 micrograms/L. We conclude that both puberty and estrogen administrations significantly increase the peak GH response to exercise, arginine, or insulin in normal subjects. Moreover, the conventional criterion that the peak GH response to three stimulation tests should exceed 7 micrograms/L was applicable in our study only to subjects who had attained pubertal stage 4 or 5 or who had received estrogen administration.

Greene SA, Torresani T, Prader A (1987) Growth hormone response to a standardized exercise test in relation to puberty and stature. Growth hormone (GH) was measured before and 10 minutes after a standardized bicycle exercise test (duration 15 minutes) in 37 short children (group 1: mean (SD) age 12.8 (3.5) years; mean (SD) bone age 10.4 (3.6) years; mean (SD) height standard deviation score (SDS) -2.8 (0.7], 16 tall children (group 2: mean age 12.9 (2.8) years; mean bone age 13.9 (1.4) years; mean height SDS 3.0 (0.8], and 30 normal children (group 3: mean age 13.3 (3.2) years; mean bone age 12.8 (3.4) years; mean height SDS -0.4 (0.8]. Results of GH are expressed as mean (SEM). The pre-exercise GH was similar in the three groups (group 1, 8.0 (2.3) m U/l, group2, 8.5 (2.5) m U/l, and group 3, 8.3 (2.3) mU/l). There was a significant rise in GH after exercise in all three groups. GH after exercise was higher in group 2(35.1 (2.5) mU/l) compared with groups 1 and 3 (17.8 (3.0) and (20.8 (3.2) mU/l).Post-exercise GH was less than 10 m U/l in 29 children (34% total; 49% group 1, 6%group 2, and 34% group 3). There was a positive relation between post-exercise GH and both bone age and public hair stage. Multiple regression analysis revealed that relevant predictors of a rise in GH with exercise were different for the sexes in these children with varying stature: for boys, bone age and pubic hair stage; for girls, height and height SDS. All the tall girls were in puberty. No statistical relation was observed between post-experience GH and cardiovascular response to exercise, time of day of exercise, time of eating before exercise, and plasma insulin or insulin to glucose ratio at time of exercise. We conclude that the GH response to the physiological stimulus of exercise is higher in puberty compared with childhood. Therefore, although children may be suspected of having GH deficiency after a failure of GH to increase after

exercise, a non-response may be a normal finding in pre pubertal children, independent of stature.

Hopwood NJ (1985) conducted study on Pathogenesis and management of abnormal puberty In the prepubertal child, the hypothalamic-pituitary-gonadal (H-P-G) axis is functional and extremely sensitive to negative feedback inhibition by low circulating levels of sex steroids. This feedback system may be under the control of unknown CNS inhibitory mechanisms. Clinical signs of puberty are preceded by increased pulsatile secretion of hypothalamic gonadotropin-releasing hormone(GnRH) followed by increased pituitary responsiveness to GnRH. Gonadotropin secretion, particularly LH, increases in both sexes, especially during sleep ,resulting in gonadal stimulation, secretion of sex steroids, and progressive physical maturation. When any phase of the H-P-G axis malfunctions, abnormal puberty can result. Abnormal puberty may be precocious or delayed. When puberty is precocious it may be isosexual or heterosexual, complete or partial, intermittent (unsustained), or progressive. True (central) precocious puberty is usually progressive, and hormonally reflective of normal puberty, although occurring at an earlier age, whereas intermittent or un-sustained precocious puberty usually is associated with immature patterns of gonadotropin secretion, or with complete gonadotropin suppression as in precocious pseudopuberty (ovarian or adrenal tumors). Cranial axial tomography, gonadotropin response to GnRH, and pelvic ultrasound in girls are useful tools to aid in the differential diagnosis of these conditions. Intermittent, or unsustained, puberty in girls is usually self-limited, requiring no medical or surgical intervention. True progressive central precocity may now be managed with GnRH analogues, which effectively arrest pubertal changes as well as slow rapid linear growth and skeletal maturation. Although a maturation lag usually explains most patterns of delayed puberty, it is often challenging to exclude other conditions that may contribute to slow pubertal progression, such as chronic illness, excessive exercise, emotional stress, anorexia, or drug use. Elevated serum gonadotropin levels direct further evaluation toward etiologies of gonadal failure, including gonadal dysgenesis, Klinefelter syndrome, and chemotherapy/irradiation damage. Both low gonadotropins and absence of or immature gonadotropin response to GnRH administration after a bone age of 11 years in girls and 13 years in boys point toward hypopituitarism or isolated hypogonadotropic hypogonadism. Management withadministration of gradually incremented amounts of sex steroids at an appropriate

psychologic age usually leads to enhanced linear growth, physical maturation, andimproved self-esteem.

Baker ER (1985) Body weight and the initiation of puberty the onset and progression through the various stages of puberty are influenced by a number of factors (Fig. 2). In both animals and humans, the age of puberty appears to be related more to body weight than to chronologic age. Under nutrition and low body fat, or an altered ratio of lean mass to body fat, seem to delay the adolescent spurt and to retard the onset of menarche. According to Frisch, a minimum level of fatness (17% of body weight) is associated with menarche; however, a heavier minimum weight for height, representing an increased amount of body fat (22%), appears necessary for the onset and maintenance of regular menstrual cycles in girls over 16 years of age. This critical amount of body fat implies that a particular body composition, in addition to other environmental and psychosocial factors, is important in triggering and maintaining the pubertal process. Pubic hair growth and breast development begins in most American females between the ages of 8-13. Menarche follows 4.2 years later for 50% of the females, but of others, the time period ranges from 18 months to 6 m or years. Both males and females experience hormonal changes before the 1st physical signs of puberty are manifested. As sex hormones increase, changes in the body's proportion of lean, fat, and skeletal mass occur. For females an increase in body fat begins at 7 years and continues through ages 16-18 years. Studies indicate that the body's fat content must account for 17% of the body's weight before menarche can occur and that, at age 18 years, the fat content must be at least 22% for the maintenance of regular menstrual cycles. In contrast overweight females often experience menarche earlier than the average weight female. Athletic females and ballet dancers frequently experience late menarche, and these delays may be due to the disruption in fat accumulation which results from excessive exercise.

2.2 STUDIES ON PUBERTAL DEVELOPMENT AMONG PRETEEN GIRLS

Balaram Pradhan and J Yoga (2009) Effect of yoga relaxation techniques on performance of digit–letter substitution task by teenagers the Subjects consisted of 253 school students, 156 boys, 97 girls, in the age range 13–16 years, who were attending a 10-day yoga training course during summer vacation. The selected subjects had English as their medium of instruction in school and they acted as their own controls. They

were allocated to two groups, and tested on the DLST, immediately before and after 22.5 minutes practice of CM on one day, and immediately before and after an equal period of SR on the other day. The first group performed CM on day 9 and SR on day 10. For the second group, the order was reversed. Within each group pre-posttest differences were significant for both the relaxation techniques. The magnitude of net score improvement was greater after SR (7.85%) compared to CM (3.95%). Significance levels were $P < 0.4 \times 10^{-9}$for SR and $P < 0.1 \times 10^{-3}$ for CM. The number of wrong attempts also increased significantly on both interventions, even after removing two outlier data points on day 1 in the SR group. Both CM and SR lead to improvement in performance on the DLST. However, these relaxation techniques lead to more wrong cancellation errors .Mean values and standard deviation for digit–letter substitution task total score, net score, and wrong substitution score

Bin Huang (2006) study on conduct Since pubertal maturation is an important covariate in studies that evaluate physical and social changes that occur during the teen years, we examined pubertal parameters in a group of US girls. The study included 615 (77.2% prepubertal) white and 541 (49.4% prepubertal) black participants. Mean onset of puberty was 10.2 and 9.6 years in white and black girls, respectively, menarche was 12.6 and 12.0, achievement of Tanner growth stage 5 was 14.3 and 13.6, and achievement of adult height was 17.1 and 16.5 years. The Pearson's correlation coefficient between menarche and onset of puberty was .37. Pre test was conducted before the experimental training and post test was conducted immediately after the experimental training. Menarche is often used as a marker for onset of puberty and for timing of puberty. Data gathered over the past 20 years suggest only moderate correlation between menarche and onset of puberty (.37-.38), which has decreased significantly during the last 50 years. This suggests the existence of both similar and unique factors that impact the age at onset of puberty and age at menarche.

2.3 STUDIES ON DYNAMIC HATHA YOGA SADHANA

Harinath et al. (2004) conducted a study on effects of hatha yoga and omkar meditation on cardio respiratory performance, psychological profile, and melatonin secretion. Thirty healthy men were randomly divided into two groups. Controls performed body flexibility exercises for 40 minutes and slow running for 20 minutes during morning hours and played games for 60minutes during evening hours daily for 3

months. Group 2 subjects practiced selected yogic postures for 45 minutes. Yogic practices for 3 months resulted in improved cardio respiratory performance and psychological profiles. Plasma melatonin also increased after three months of yogic practices.

Boyle et al. (2004) conducted a study on the effects of yoga training and a single bout of yoga on delayed onset muscle soreness in the lower extremity. The purpose of this study was to determine the effects of yoga training on the intensity of delayed onset muscle soreness. 24 yoga-trained and non-yoga-trained women were administered a bench-stepping exercise. Muscle soreness was assessed using a Visual Analog Scale. Groups were also compared on body awareness, flexibility using the sit-and-reach test, and perceived exertion. Muscle soreness decreased and flexibility increased using the sit-and-reach-test after yoga.

Madanmohan et al. (2004) conducted a study on modulation of cardiovascular response to exercise by yoga training. This study reports 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 the 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 the supine position before exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. Exercise produced a significant increase in HR, systolic pressure and a significant decrease in diastolic pressure. After two months of yoga training, exercise-induced changes in these parameters were significantly reduced. Conducted a study on modulation of cardiovascular response to exercise by yoga training. This study reports 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 the 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 the supine position before exercise and at 1, 2, 3, 4, 5, 7 and 10 minutes after the exercise. Exercise produced a significant increase in HR, systolic pressure and a significant decrease in diastolic pressure. After two months of yoga training, exercise-induced changes in these parameters were significantly reduced.

Tran et al. (2001) showed that ten healthy, untrained volunteers (nine females and one male), ranging in age from 18–27 years, were studied to determine the effects of dynamic hatha yoga practice on the health-related aspects of physical fitness, including muscular strength and endurance, flexibility, cardio respiratory fitness, body composition, and pulmonary function. Subjects were required to attend a minimum of two yoga classes per week for a total of 8 weeks. Each yoga session consisted of 10 minutes of pranayamas (breath-control exercises), 15 minutes of dynamic warm-up exercises, 50 minutes of asanas (yoga postures), and 10 minutes of supine relaxation in savasana (corpse pose). The subjects were evaluated before and after the 8-week training program. Isokinetic muscular strength for elbow extension, elbow flexion, and knee extension increased by 31%, 19%, and 28% ($p<0.05$), respectively, whereas isometric muscular endurance for knee flexion increased 57% ($p<0.01$). Ankle flexibility, shoulder elevation, trunk extension, and trunk flexion increased by 13% ($p<0.01$), Review of Related Literature 44155% ($p<0.001$), 188% ($p<0.001$), and 14% ($p<0.05$), respectively. Absolute and relative maximal oxygen uptake increased by 7% and 6%, respectively ($p<0.01$). These findings indicate that regular hatha yoga practice can elicit improvements in the health-related aspects of physical fitness.

Baldwin (1999) conducted study on psychological and physiological influences of Hatha Yoga training on healthy, exercising adults. The purpose of this study was to explore 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/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 Review of Related Literature 49eight 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 affect 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, at the same time that sources of stress for that group increased.

2.4 STUDIES ON STATIC HATHA YOGA SADHANA

Telles et al. (2004) conducted a study on an evaluation of the ability to voluntarily reduce the heart rate after a month of yoga practice. This study determined whether yoga reduced heart rate and whether the reduction would be more after 30 days of yoga training. Two groups (yoga and control, n = 12 each) were assessed on Day 1 and on Day 30. During the intervening 30 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 30 compared to Day 1 by a group average of 10.7 beats per minute (i.e., bpm) and 6.8 bpm.

Venkatareddy et al. (2003) examine the effect of static yoga on weight and fat fold thickness in obese women. In this study 30 obese women of age range 19-53, categorized into two groups, as per Body Mass Index (BMI), were exposed to one hour practice of asanas and pranayamas in the morning for a period of 90 days. A significant reduction ($P<0.05$) in BMI was seen in both the groups. In-group II (BMI greater than 35) the reduction was greater as compared to group II (BMI 25-35). Lean Body Mass (LBM), however, did not show significant change in both the groups.

Malhotra (2002) experimented on study of yoga asanas in assessment of pulmonary function in NIDDM patients aging 24 of type 2 diabetics. These middle-aged subjects were type II diabetics on anti hyperglycaemic and a dietary regimen. Training in yoga asanas occurred 30-40 min/day for 40 days. There was a significant decrease in fasting blood glucose levels. The postprandial blood glucose levels also decreased. The FEV1, FVC, PEFR, MVV increased significantly. Yoga has potential for benefit for patients with CAD. Yoga lifestyle intervention retards progression and increases regression of coronary atherosclerosis in patients with severe CAD. It also improves symptomatic status, functional class and risk factor profile.

Birkel and Edgren (2000) studied on static hatha yoga: improved vital capacity of college students. To determine the effects of yoga postures and breathing exercises on vital capacity, researchers measured vital capacity using the Spiropet spirometer. Vital capacity determinants were taken near the beginning and end of two 17-week semesters. 89 men and 198women were taught yoga poses, breathing techniques, and relaxation in two 50-minute class meetings for 15 weeks. The study showed a significant improvement in vital capacity across all categories over time.

Telles et al. (1996) "Physiological Measures of Right Nostril Breathing". This study was conducted to assess the physiological effects of a Yoga breathing practice that involves breathing exclusively through the right nostril. This practice is called Surya Anuloma Viloma Pranayama (SAV). Twelve volunteers took part on two consecutive days. The test sessions were conducted on two consecutive days. One day the test session involved practicing SAV Pranayama for 45 minutes (SAV session). During the test period on the Review of Related Literature 50 Other day subjects were asked to breathe normally for 45 minutes (NB session). For half the patients (randomly chosen) the SAV session was on the first day and NB session on the next day. For the remaining six patients the order of the two sessions was reversed. After the SAV session (but not after NB) there was a significant ($P < .05$, paired t – test two tailed) increase in oxygen consumption (17%) and in systolic blood pressure (mean increase 9.4 mm Hg). The latter two changes are interpreted to be the result of increased cutaneous vasoconstriction. These findings show that SAV has a sympathetic stimulating effect. This technique and other variations of unilateral forced nostril breathing deserve further study regarding therapeutic merits in a wide range of disorders.

Schell et al. (1994) conducted a study on physiological and psychological effects of static Hatha-Yoga exercise in healthy women. They measured heart rate, blood pressure, the hormones cortisol, prolactin and growth hormone and certain psychological parameters. There were no substantial differences between the yoga practicing group and a control group concerning endocrine parameters and blood pressure. The course of heart rate was significantly different; the yoga group had a decrease during the yoga practice.

Telles et al. (1993) "Improvement in Static Motor Performance Following Yogic Training of School Children". Two groups of 45 children each, whose ages ranged from 9 to13years, were assessed on a staidness test, at the beginning and again at the end of a 10-day period during which one group received training in Yoga, while the other group did not. The steadiness test required insertion and holding for 15 sec. a metal stylus without touching the sides of holes of decreasing sizes in a metal plate. The contacts were counted as 'errors'. During the 10-day period, one group (the 'Yoga' group) received training in special physical postures (Asanas), voluntary regulation of breathing (Pranayama), maintenance of silence, as well as visual focusing exercise (Tratakas) and games to improve the attention span and memory. The other group showed a significant (Wilcoxon's paired signed-ranks test) decrease in errors, whereas the 'control' group showed no change.

Makwana et al. (1988) conducted a study on effect of short term syatic yoga practice on ventilatory function tests. Twenty five normal male volunteers undergoing a ten week yoga course were assessed by ventilatory function tests. The observations recorded at the end of ten weeks of the course showed improved ventilatory functions in the form of lowered respiratory rate, increased forced vital capacity, FEV1, maximum breathing capacity and breath holding time, while tidal volume and %FEV1, did not reveal any significant change.

Singh (2010) compared the isometrics, yogic physical culture and combination training on body composition and physical fitness status of high school boys. Results of this study have shown that all the three exercise groups showed a significant increase in toe-touching scores. The inter group differences show that yogic physical culture is more helpful in developing flexibility than the isometric and combination groups. And in dynamic flexibility, comparatively yogic exercises were the best in developing dynamic flexibility. Gore and Bhole (1982) conducted study on Heart Rate during Paschimottanasana and similar type of isotonic exercises. Heart rate increased by 32% when Paschimottanasana was practiced with an isometric base, by 13% when it was repeated four times with an isotonic base and only by 6% when it was performed in a relaxed manner as a posture for one minute each.

Bhole (1979) conducted a study on Inspiratory volume and Breath-Holding Time in Pranaymic Breathing in Difference conditions of the Abdominal Wall. No

significant difference was found in the inspiratory volume (3375ml) and breath holding time (25seconds) in Pranaymic breathing with protracted relaxed and controlled conditions of the abdominal wall but the feelings varied to a great extent. Bhole (1979) conducted a study on Inspiratory volume and Breath-Holding Time in Pranaymic Breathing in Difference conditions of the Abdominal Wall. No significant difference was found in the inspiratory volume (3375ml) and breath holding time (25seconds) in Pranaymic breathing with protracted relaxed and controlled conditions of the abdominal wall but the feelings varied to a great extent. Improvement in Static Motor Performance Following Yogic Training of School Children". Two groups of 45 children each, whose ages ranged from 9 to 13 years, were assessed on a staidness test, at the beginning and again at the end of a 10-day period during which one group received training in Yoga, while the other group did not. The steadiness test required insertion and holding for 15 sec. a metal stylus without touching the sides of holes of decreasing sizes in a metal plate. The contacts were counted as 'errors'. During the 10-day period, one group (the 'Yoga' group) received training in special physical postures (Asanas), voluntary regulation of breathing (Pranayama), maintenance of silence, as well as visual focusing exercise (Tratakas) and games to improve the attention span and memory. The other group showed a significant (Wilcoxon's paired signed-ranks test) decrease in errors, whereas the 'control' group showed no change.

2.5 STUDIES ON SOCIO ENVIRONMENT

Nicole Larson & Mary Story (2009) conducted a study on a review of Environmental Influences on Food Choices Diet-related environmental and policy interventions are being advocated at a population level because individual change is more likely to be facilitated and sustained if the environment within which choices are made supports healthful food options. This study aims to review research that examines factors having an influence on food choices in social environments, physical environments, and macro-environments. A snowball strategy was used to identify relevant peer-reviewed studies and reviews, with a focus on research completed in the US and published within the past 10 years. Research has identified a number of environmental factors associated with dietary intake; however, the majority of completed studies have methodological limitations which limit their credibility to guide

interventions and policy changes. Future research will need to emphasize multilevel investigations, examine how associations vary across population subgroups, develop a standard set of measures for assessing food environments and policies, and improve dietary assessment methodology.

Julia A. Graberc et al. (2008) conducted a study on the antecedents of menarcheal Age: Heredity, Family Environment, and Stressful Life Events Variations in pubertal timing, specifically age at menarche, have been associated with several antecedents, both genetic and environmental. Recent research has considered a broader range of environmental stressors and their influence on the development of the reproductive system. In this investigation, the following possible antecedents were considered: (a) hereditary transmission, (b) weight and weight for height, (c) stressful life events, (d) family relations, (e) absence or presence of an adult male in the household, and (f) psychological adjustment. Subjects were 75 premenarcheal girls between the ages of 10 and 14 drawn from a larger longitudinal investigation of adolescent development. Girls were from white, well-educated, middle- to upper-middle-class families and attended private schools in a northeastern urban area. While breast development, weight, family relations, and depressive affect were predictive of age at menarche, family relations predicted age at menarche above the influence of breast development or weight. A trend for maternal age at menarche to predict adolescent's age at menarche was found. Weight for height, presence of an adult male in the household, and stressful events were not predictive of age at menarche. These complex interactions of biological and psychosocial development demonstrated here may account to some extent for the inter- and intra individual variation observed in pubertal development.

Amy F. Feldman and Jennifer L. Matjasko (2005) conducted a study on the Role of School-Based Extracurricular Activities in Adolescent Development: A Comprehensive Review and Future Directions. This article reviews the contemporary literature on school-based activity participation, focusing on patterns of participation, academic achievement, substance use, sexual activity, psychological adjustment, delinquency, and young adult outcomes. Also, the authors discuss possible mediators and moderators of extracurricular activity participation in regard to adolescent development. The review indicates that the associations between school-based activity participation and these outcomes are mostly positive but that the picture becomes

mixed once moderator variables are included. The authors suggest areas for future research that include using new methods for measuring activities and applying an overarching theoretical framework to investigations of extracurricular activities and adolescent development. Finally, to move toward a causal model of activities and adolescent functioning, future research must consider the mechanisms through which activities exert their influence on development. The authors propose several possible mechanisms of participation in terms of adjustment during adolescence and young adulthood.

Heather Patrick (2005) conducted a study on a review of Family and Social Determinants of Children's Eating Patterns and Diet Quality with the growing problem of childhood obesity, recent research has begun to focus on family and social influences on children's eating patterns. Research has demonstrated that children's eating patterns are strongly influenced by characteristics of both the physical and social environment. With regard to the physical environment, children are more likely to eat foods that are available and easily accessible, and they tend to eat greater quantities when larger portions are provided. Additionally, characteristics of the social environment, including various socioeconomic and socio cultural factors such as parents' education, time constraints, and ethnicity influence the types of foods children eat. Mealtime structure is also an important factor related to children's eating patterns. Mealtime structure includes social and physical characteristics of mealtimes including whether families eat together, TV-viewing during meals, and the source of foods (e.g., restaurants, schools). Parents also play a direct role in children's eating patterns through their behaviors, attitudes, and feeding styles. Interventions aimed at improving children's nutrition need to address the variety of social and physical factors that influence children's eating patterns.

Marla E. Eisenberg, (2005) conducted a study on the role of social norms and friends' influences on unhealthy weight-control behaviors among adolescent girls Dieting is common among adolescent girls and may place them at risk of using unhealthy weight-control behaviors (UWCBs), such as self-induced vomiting, laxatives, diet pills, or fasting. Research has suggested that social factors, including friends and broader cultural norms, may be associated with UWCBs. The present study examines the relationship between the school-wide prevalence of current weight loss efforts among adolescent girls, friends' dieting behavior, and UWCBs, and investigates

differences in these associations across weight categories. Survey data were collected in 31 middle and high schools in ethnically and socio-economically diverse communities in Minnesota, USA. The response rate was 81.5%. Rates of UWCBs were compared across the spectrum of prevalence of trying to lose weight and friends' involvement with dieting, using $\chi 2$ analysis and multivariate logistic regression, controlling for demographic factors and clustering by school. Girls with higher body mass index (BMI) were more likely to engage in UWCBs than those of lower BMI. Multivariate models indicated that friends' dieting behavior was significantly associated with UWCBs for average weight girls (OR=1.57, CI=1.40–1.77) and moderately overweight girls (OR=1.47, CI=1.19–1.82). The school-wide prevalence of trying to lose weight was significantly, albeit modestly, related to UWCBs for average weight girls (15th–85th percentile; OR=1.17, CI=1.01–1.36), and marginally associated for modestly overweight girls (85th–95th percentile; OR=1.21, CI=.97–1.50), even after controlling for friends' dieting behaviors. The social influences examined here were not associated with UWCBs among underweight (<15th percentile) or overweight (>95th percentile) girls. Findings suggest that social norms, particularly from within one's peer group, but also at the larger school level may influence UWCBs, particularly for average weight girls. Implications for school-based interventions to reduce UWCBs are discussed.

Mary Story et al. (2002) conducted a study on individual and environmental influences on adolescent eating behaviors food choices of adolescents are not consistent with the Dietary Guidelines for Americans. Food intakes tend to be low in fruits, vegetables, and calcium-rich foods and high in fat. Skipping meals is also a concern among adolescents, especially girls. Factors influencing eating behaviors of adolescents need to be better understood to develop effective nutrition interventions to change eating behaviors. This article presents a conceptual model based on social cognitive theory and an ecological perspective for understanding factors that influence adolescent eating behaviors and food choices. In this model, adolescent eating behavior is conceptualized as a function of individual and environmental influences. Four levels of influence are described: individual or intrapersonal influences (eg, psychosocial, biological); social environmental or interpersonal (eg, family and peers); physical environmental or community settings (eg, schools, fast food outlets, convenience stores); and macrosystem or societal (eg, mass media, marketing and advertising, social and cultural norms).

Block J (1998) conducted a study on Drug usage in early adolescence (age 14) was related to concurrent and pre-school personality characteristics for a sample of 54 girls and 51 boys. The personality concomitants and antecedents of drug use differed somewhat as a function of gender and the drug used. At age 14, for both sexes, the use of marijuana was related to ego under control, while the use of harder drugs reflected an absence of ego-resiliency, with under control also a contributing factor. At ages 3/4, subsequent adolescent drug usage in girls related to both under control and lower ego-resiliency. In boys, adolescent drug usage related strongly, during their nursery school years, to under control and with resiliency having no long-term implications. Early family environment related to adolescent drug usage in girls but not in boys. Drug usage in adolescent girls was related to homes earlier identified as unstructured and laissez-faire, where there was little pressure to achieve. Drug usage related to other substance use and, in boys, to IQ decline from age 11 to age 18. Implications of these results for contemporary views regarding adolescent drug usage are discussed.

Keenan Kate et al. (1997) conducted a study on developmental and social influences on young girls' early problem behavior A developing body of research suggests that there are few sex differences in the rate and severity of problem behavior in early childhood, but clear sex differences emerge at about 4 years of age. The authors explore 2 hypotheses to further the understanding of emerging sex differences in problem behavior across the first 5 years of life. The first posits that the change in girls' problem behavior from infancy to school entry represents a channeling of early problem behavior into predominantly internalizing problems as a result of socialization. The second hypothesis is that the change in girls' early problem behavior during the preschool period results from the more rapid biological, cognitive, and social–emotional development of girls relative to boys. The authors review research on the influence of parents, teachers, and peers on girls' behavior from infancy to preschool regarding the first hypothesis, whereas they review studies of sex differences in developmental processes to test the second. They find moderate support for both hypotheses and present a comprehensive theory of girls' developmental psychopathology that integrates social and developmental influences.

Michael Lewis (1984) Conducted a study on predicting psychopathology in Six-Year-Olds from Early Social Relations 113 children were seen at 1 and 6 years of age in order to examine the relationship between the quality of the early attachment

relationship and later psychopathology. On the basis of scores from the Achenbach and Edelbrock Child Behavior Profile, an outcome measure of psychopathology at 6 years, the results indicated different outcomes for male and female children. For males, attachment classification at 1 year was significantly related to later psychopathology; insecurely attached males showed more psychopathology than securely attached males. No relationship between attachment and later psychopathology was observed for females. Even for males, the attachment classification only partly predicted later behavioral problems. Several other factors, including life-stress events and family demographic variables, appeared to influence the development of psychopathology. The findings suggest that although the child's attachment relationship plays an important role in the development of psychopathology, the child is neither made invulnerable by an early secure attachment nor doomed to psychopathology by an insecure attachment.

2.6 SUMMARY ON THE RELATED LITERATURE

The investigator has complied and reviewed the literature and professional reviews related to pubertal development, pubertal dimension among preteen girls, dynamic hatha yogic sadhana, static hatha yoga sadhana, socio environment from the library of Tamil Nadu Physical Education Sports University and the material available on the internet to gain sufficient knowledge related to this research work.

The review shows that there is a positive impact in hatha yogic practice on socio-environmental and pubertal development dimensions among pre-teen girls. Based on the yoga studies review, the researcher has chosen this topic as well as the reviews supported on this study and since this is a new research study done on pre-teen girls through Hatha yoga practice in dynamic and static, there is no related research reviews based on this study. The investigator formulated suitable methodology in this research that is presented in Chapter III.

CHAPTER - III
METHODOLOGY

Research methodology involves the systematic procedure by which researcher starts from the initial identification of the problem to its final conclusion. The role of the methodology is to carry on the research work in a scientific and valid manner. The purpose of the study was to find out whether there would be any significant effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development dimension among preteen girls.

The methodology and systematic procedure applied in this research include the process of identification of the research problem to its final conclusion. The aim of methodology applied is to carry on the research work in a scientific and valid manner. The methodology used in this research involved the selection of subjects, selection of the variables; experimental design, and orientation of the subjects, instrument reliability tester reliability, pilot study, test administration and statistical technique employed for analysis of the data.

3.1 SELECTION OF SUBJECTS

For the purpose of the study the investigator has selected 30 preteen pubertal girls from Chennai city, between the age group of 9 to 12 years and they have been divided into three groups I, II, & III of ten subjects in each group. All the subjects were assigned to two experimental groups, I and II and the other group III was Control group.

1. Group I - Static Hatha Yoga Sadhana Practices Group
2. Group II - Dynamic Hatha Yoga Sadhana Practices Group
3. Group III - Control Group

3.2 SELECTION OF VARIABLES

The investigator reviewed the available scientific literature pertaining to the study from books, journals, periodicals, magazines, research papers and available sources from Tamilnadu physical education and Sports University, Madras University

and also with help of professional experts in yoga, the following Socio environmental and pubertal development dimension variables were selected.

3.2.1 INDEPENDENT VARIABLES

1. Static Hatha Yoga Sadhana
2. Dynamic Hatha Yoga Sadhana

3.2.2 DEPENDENT VARIABLES

1. **SOCIO ENVIRONMENTAL VARIABLES**
    i. Sedentary behavior
    ii. Physical activity
    iii. Family cohesion
    iv. Eating attitude
2. **PUBERTAL DEVELOPMENT VARIABLES**

    i. Dehydroepiandrosterone (DHEA)
    ii. Luteinizing hormone (LH)
    iii. Gonadotrophin releasing hormone (GnRH)
    iv. Follicle stimulating hormone (FSH)

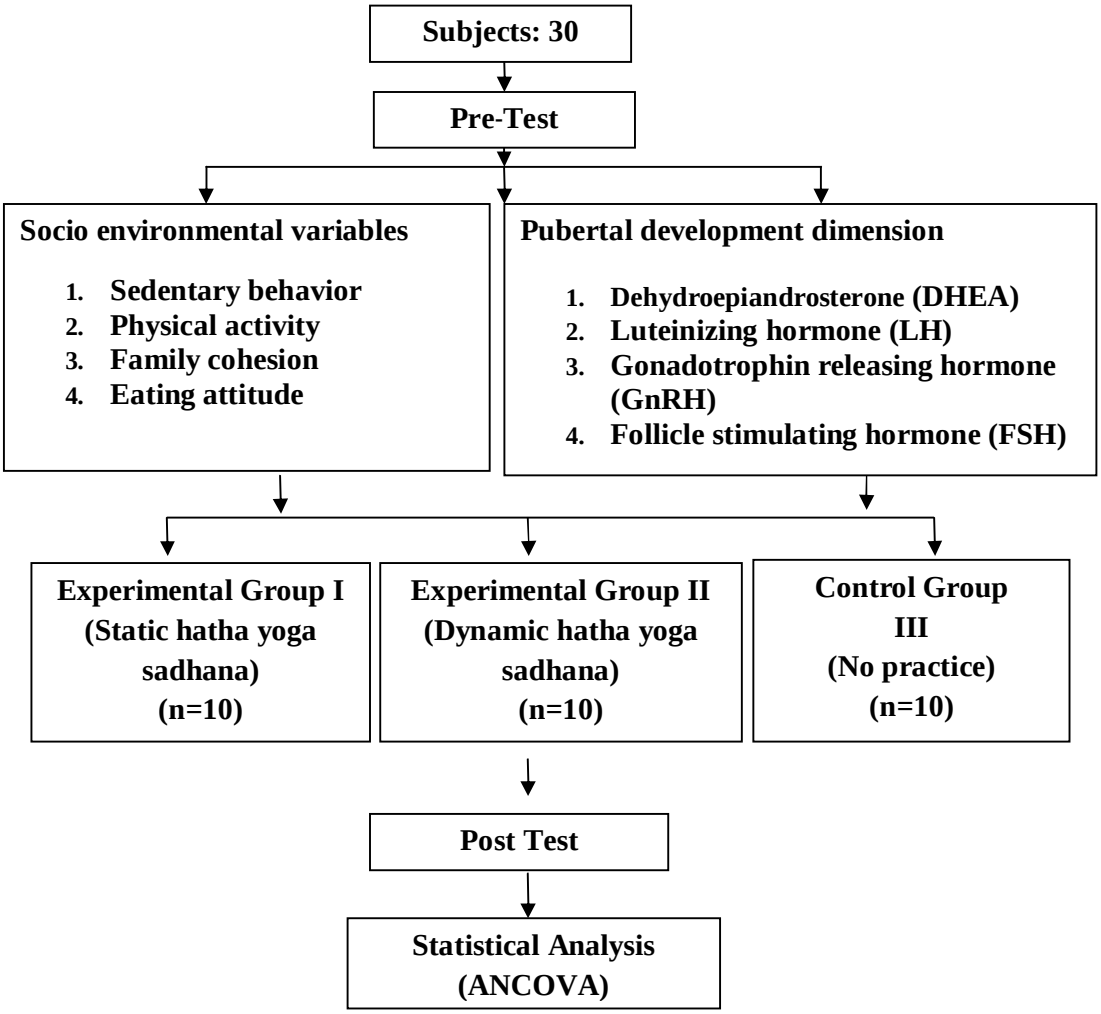
3.3 EXPERIMENTAL DESIGN

The study was formulated as a true random research group design consisting of a pre test and post test. For the purpose of the study the subjects of thirty pubertal development preteen girls between the age group of 9 to 12 years were selected and divided into three groups via two experimental groups and one Control group. All the groups were tested on selected variables before the practice. After the test scores recorded the experimental groups underwent practice as follows

1. Group I –10 Subjects were practiced on Static Hatha Yoga Sadhana
2. Group II –10 subjects were practiced on Dynamic Hatha Yoga Sadhana
3. Group III – 10 subjects treated as the Control group.

Both the experimental groups were given practice for fifteen weeks from Monday to Friday (five days a week). The post test scores were also recorded on selected socio environmental and pubertal development dimension variables, and both

pre and post tests mean values were compared for analysis using statistical technique of analysis of covariance (ANCOVA)



3.4 PILOT STUDY

The pilot study was conducted with five girls before the actual practice started to assess the initial capacity of the subjects and in order to fix the load on the both the experimental groups and the difficulties were rectified. Based on the response of the subjects in the pilot study and the calculated intra- class correlation of the pilot study found that they were within the reach of the individual's capacity and showed that there was significant changes in health related variables. This enabled the investigator to undertake the practice schedule for the purpose of research.

3.5 SUBJECTS ORIENTATION

Prior to the administration of the test, a detailed discussion was carried out with the subjects about the practice procedure and techniques, its benefits and limitations by the researcher. Before the scientific test administration, procedure was explained in detail and proper understanding, co-operation for reliability of the data.

3.6 CRITERION MEASURES

By glancing the literature and in consultation with professional and experts the following criterion measure were selected for measuring the variables in the study

Table I

CRITERION MEASURES AND QUESTIONNAIRE / TEST USED

S.No	Criterion Measures	Questionnaire / Test Used
	Socio Environmental Variables	
1	Sedentary behavior	Sedentary behavior questionnaire (SBQ) by James F. Sallis 2010
2	Physical Activity	The Physical Activity Questionnaire for Children (PAQ-C) Manual by Kowalski, K., Crocker, P., & Donen, R.(1997)
3	Family Cohesion	Family Cohesion by Moos, R. H. (1974)
4	Eating Attitude	Children's Eating Attitude Test (ChEAT) by Garner et.al., (1982)
	Pubertal Development Dimension Variables	
5	DHEA Test (Dehydroepiandrosterone)	Salek. SA (2002)
6	LH Test (Luteinizing hormone)	Kaplan. LA (1996)
7	GnRH Test (Gonadotrophin releasing hormone)	Sonis. WA (1986)
8	FSH Test (Follicle Stimulating hormone)	Haymond. S (2006)

3.7 RELIABILITY OF DATA

The reliability of data was ensured by using standard instrument and by establishing tester competency and reliability of the test. The investigator took all the measurements with the intense of other professionals from a recognized laboratory with regard to bio-chemical test

3.8 INSTRUMENT RELIABILITY

Standardized equipment was used for the testing procedure. The equipments were obtained from a recognized laboratory and their calibrations were accepted as enough for the purpose of the study. The instruments used Standard / modified test for measuring, Sedentary behavior, Physical activity, Family cohesion, Eating attitude questionnaire designed. The pubertal development dimension variables Dehydroepiandrosterone (DHEA), Luteinizing hormone (LH), Gonadotrophin releasing hormone (GnRH), and Follicle stimulating hormone (FSH) were tested in the authorized laboratory.

3.9 TESTER RELIABILITY

The reliability of data together with the reliability of the tester was ensured by appointing an authorized personal from a recognized laboratory. The investigator took all the precaution with regard to pubertal development dimension variables test. Before conducting the test the researcher discussed about the testing procedure with concerned guide and staff members and got sufficient experience the test.

3.10 SUBJECT'S RELIABILITY

The test and retest also conducted to the same subjects under similar condition by the same tester.

3.11 TESTER'S COMPETENCY

The intra class correlation coefficient obtained for test-retest data are presented in Table II.

TABLE II

INTRA CLASS CORRELATION COEFFICIENT OF TEST – RETEST SCORES

S.No	VARIABLES	COEFFICIENT OF CORRELATION
1.	Sedentary behavior	97*
2.	Physical activity	97*
3.	Family cohesion	98*
4.	Eating attitude	97*
5.	Dehydroepiandrosterone (DHEA)	98*
6.	Luteinizing hormone (LH)	97*
7.	Gonadotrophin releasing hormone (GnRH)	98*
8.	Follicle Stimulating hormone (FSH)	97*

*Significant at 0.05 level

Reliability was established by the test-retest processes. Thirty Preteen girls were tested on selected variables. The repeated measurement of individuals on the same test is done to determine reliability.

3.12 PRACTICE PROGRAMME

The subjects were selected at random and were divided into three groups and the group I was given Static hatha yoga sadhana and group II was trained Dynamic hatha yoga sadhana for duration of one hour from Monday to Friday (5 days a weeks) for fifteen weeks, and the group III which is Control group was not given any practice.

PRACTICE SCHEDULE

Table III

STATIC HATHA YOGA SADHANA GROUP (Experimental Group I)

S.No	Yoga Sadhana	Repetition/ Mins
1.	**Pawanamuktasan (Sukshma Vyayama)** i. Padanguli Naman ii. Goolf Naman Chakra iii. Goolf Ghoonan iv. Janu Naman v. Janu Chakra vi. Shroni Chakra vii. Ardha Titali Asana viii. Poorna Titali Asana ix. Mushtika Bandhana x. Manibandha Naman xi. Manibandha Chakra xii. Kehuni Naman xiii. Skandha Chakra xiv. Greeva Sanchalana	**3 / 10**
2.	**Suryanamaskar**	**5 / 10**
3.	**Asanas (Postures)** i. Utkatasana ii. Trikonasana iii. Ardha chakrasana iv. Ekapadasana v. Bhujangasana vi. Salabasana vii. Dhanurasana viii. Halasana ix. Chakrasana	**3 / 20**
4.	**Pranayama (Breathing)** i. Nadi Sodhana **ii.** Bhramari **iii.** Anulom Viloma **iv.** Ujjai	**10**
5.	**Yoga Nidra**	**10**

Table IV

DYNAMIC HATHA YOGA SADHANA (Experimental Group II)

S.No	Yoga Sadhana	Repetition/ Mins
1.	**Pawanamuktasan (Sukshma Vyayama)** i. Padanguli Naman ii. Goolf Naman Chakra iii. Goolf Ghoonan iv. Janu Naman v. Janu Chakra vi. Shroni Chakra vii. Ardha Titali Asana viii. Poorna Titali Asana ix. Mushtika Bandhana x. Manibandha Naman xi. Manibandha Chakra xii. Kehuni Naman xiii. Skandha Chakra xiv. Greeva Sanchalana	**5 / 10**
2	**Suryanamaskar**	**10 / 10**
3	**Asanas (Postures)** i. Utkatasana ii. Trikonasana iii. Ardha chakrasana iv. Ekapadasana v. Bhujangasana vi. Salabasana vii. Dhanurasana viii. Halasana ix. Chakrasana	**5 / 20**
4	**Pranayama (Breathing)** v. Nadi Sodhana **vi.** Bhramari **vii.** Anulom Viloma **viii.** Ujjai	**10**
5	**Yoga Nidra**	**10**

3.13 PRACTICE PROCEDURE

3.13.1 PAWANAMUKTASAN (SUKSHMA VYAYAMA)

PADANGULI NAMAN

Figure 1

Step 1 - Inhale toes moves backwards

Step 2 - Exhale toes moves forwards

GOOLF NAMAN CHAKRA

Figure 2

Step 1 - Inhale feet moves backwards

Step 2 - Exhale feet moves forwards

Step 3 - Slowly rotate feet clockwise then anti-clockwise

Step 4 - Inhale on upwards Exhale downwards

GOOLF GHOORAN

Figure 3

Step 1 - Bend the he right knee and bring the foot towards the groin place the foot on

left thigh

Step 2 - Hold the right ankle with right hand, toes of the right foot with the left hand

Step 3 - Slowly rotate feet clockwise then anti-clockwise repeat other leg

JANU NAMAN

Figure 4

Step 1 - Stay in the base position. Bend the right knee bringing the thigh near chest clasp the hands under the right thigh

Step 2 - Straighten the right leg

Step 3 - Inhale straighten the leg exhale bending the leg

JANU CHAKRA

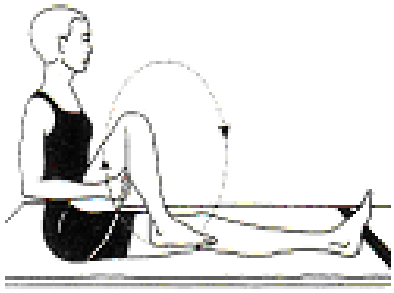


Figure 5

Step 1 - Stay in the base position. Bend the right knee bringing the thigh near chest clasp the hands under the right thigh

Step 2 - Slowly rotate knee clockwise then anti-clockwise repeat other leg

Step 3 - Inhale on upwards Exhale downwards

SHRONI CHAKRA

Figure 6

Step 1 - Bend the he right knee and bring the foot towards the groin place the foot on left thigh

Step 2 - Hold the right knee with right hand, toes of the right foot with the left hand

Step 3 - Slowly rotate knee clockwise then anti-clockwise repeat other leg

Step 4 - Inhale straighten the leg exhale bending the leg.

ARTHA TITALI ASANA

Figure 7

Step 1 - Bend the he right knee and bring the foot towards the groin place the foot on left thigh

Step 2 -Hold the right knee with right hand, toes of the right foot with the left hand

Step 3 - Right knee upwards and push the knee downwards

POORNA TITALI ASANA

Figure 8

Step 1 - Sit in the base position.

Step 2 - Bend the knees bring the soles of the feet together keeping heels close to perineum

Step 3 - Claps the feet with the both hands

MUSHTIKA BANDHANA

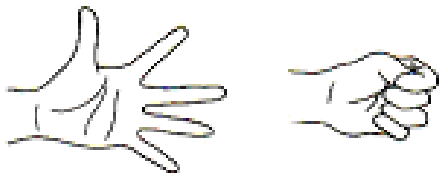


Figure 9

Step 1 - Step 1 -Sit in the base position.

Step 2 - Inhale on opening the hands

Step 3 - Exhale on closing the hands

MANIBANDHA NAMAM

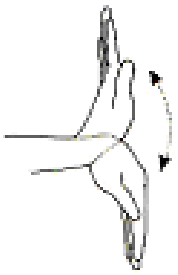


Figure 10

Step 1 - Sit in the base position.

Step 2 - Inhale with backwards movements

Step 3 - Exhale with forwards movements

MANIBANDHA CHAKRA

Figure 11

Step 1 - Sit in the base position.

Step 2 - Keep the hands at shoulder level

Step 3 - Rotate the fists together in same direction then next anti-direction

KEHUNI NAMAM

Figure 12

Step 1 - Sit in the base position.

Step 2 - Keep the hands at shoulder level

Step 3 - Inhale while straightening the arms

Step 4 - Exhale while bending the arms

SKANDHA CHAKRA

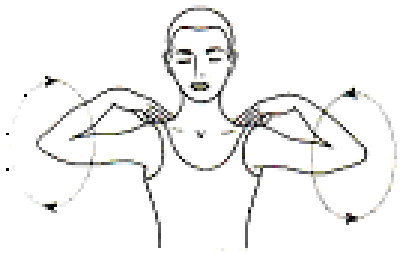


Figure 13

Step 1 - It in the base position.

Step 2 - Keep the hands at shoulder level

Step 3 - Bending the arms. Fingers place on the shoulder

Step 4 - Inhale on the upwards

Step 5 - Exhale on the downwards

Step 6 - Rotate shoulder 10 clocks then anti clock 10 times

GREEVA SANCHALANA

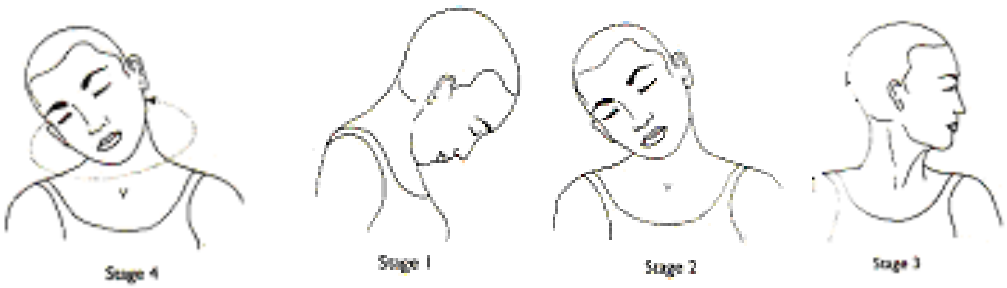


Figure 14

Step 1 - Sit in the base position.

Step 2 - While inhale neck face upwards

Step 3 - While exhale neck face downwards. Its called “yes “movements

Step 4 - While inhale neck face straight exhale bent right and left side. These movements called “ok” movements

Step 5 - While inhale neck face straight exhale turn right and left side. Its called “no” movements

ASANAS

UTKATASANA

Figure 15

Step 1 - Chair sitting posture

Step 2 - Stand in Tadasana

Step 3 - Stretch hands in front to the shoulders level

Step 4 - Bend the knee; try to sit like a chair.

Step 5 - Inhale and come up from the position

TRIKONASANA

Figure 16

Step 1 - Three triangle posture

Step 2 - Stand in Tadasana

Step 3 - Feet apart slightly more than shoulder width

Step 4 - Lift right hand above the head and feel the stretch

Step 5 - Bend towards left while exhaling.

Step 6 - Left hand resting on left leg.

ARDHA CHAKRASANA

Figure 17

Step 1 - Half wheel posture

Step 2 - Stand in Tadasana.

Step 3 - Slowly side up the palms and support the back

Step 4 - Bend backwards from lumbar region

Step 5 - Bend neck backwards.

EKAPADASANA

Figure 18

Step 1 - One foot standing posture.

Step 2 - Stand in Tadasana

Step 3 - Fold the right leg and place inside left thigh

Step 4 - Keep the heel high up and toes pointing downwards

Step 5 - Slowly bring hands down and release the posture

BHUJANGASANA

Figure 19

Step 1 - Serpent posture

Step 2 - Lay down in prone posture

Step 3 - Place the palms by the side of the cheeks

Step 4 - Elbows towards chest

Step 5 - Slowly lift your head and then bend backwards

Step 6 - Bring your head down and then bend backwards

SALABHASANA

Figure 20

Step 1 - Locust posture

Step 2 - Keep the palms under the thigh

Step 3 - Raise both legs together up from the waist

Step 4 - Exhale and return to starting position

DHANURASANA

Figure 21

Step 1 - Bow posture

Step 2 - Lay down in prone posture

Step 3 - Fold the knees and hold with both hands

Step 4 - Raise the head and stretch legs and hands out

Step 5 - The spine is arched backwards like a bow

Step 6 - Slowly release hands and legs and come to starting position

HALASANA

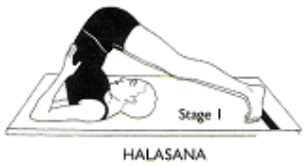


Figure 22

Step 1 - Plough posture

Step 2 - Lay down in supine position

Step 3 - Raise both the legs together up to 90 degrees

Step 4 - Raise your buttocks and the trunk

Step 5 - Support the back with both leg hands

Step 6 - Place the legs down above the head

Step 7 - Slowly bring the legs straight down

Step 8 - Release the posture, come to starting position

CHAKRASANA

Figure 23

Step 1 - Wheel posture

Step 2 - Start with supine position

Step 3 - Bend the knees and place the heels closest to buttocks

Step 4 - Place the palms by the side of the respective ears

Step 5 - Stretch both legs and palms and balance

Step 6 - Slowly bring the body down and release the posture

PRANAYAMA

NADI SODHANA

Figure 24

Step 1 - Alternate nostril breathing

Step 2 - Sit in any comfortable asanas with spine erect, eyes closed.

Step 3 - Close the right nostril, with the thumb.

Step 4 - Inhale through the left nostril, then close the left nostril

Step 5 - Exhale through the right nostril.

Step 6 - Inhale through the right nostril, then close the right nostril

Step 7 - Exhale through the left nostril.

Step 8 - Continue doing 10 to 15 rounds.

BHRAMARI

Figure 25

Step 1 - Sit in any comfortable asanas with spine erect

Step 2 - Plug the ears with the thumb finger and other four finger on the eyes, nose and near mouth.(Shanmukhi mudra)

Step 3 - Release a murmuring sound like that of a humming bee as you exhale slowly.

Step 4 - Repeat for 10 to 15 rounds.

ANULOMA VILOMA

Figure 26

Step 1 - Inhale by first expanding the abdomen and then the chest in one slow, smooth motion until the maximum possible amount of air has been drawn into the lungs.

Step 2 - Then exhale and allow the air to passively escape form the lungs.

Step 3 - This should be accompanied by a feeling of letting go and relaxation.

Step 4 - Inhalation is active, exhalation is passive.

Step 5 - The whole movement should be smooth(no jerks) from the abdomen to the chest, like a wave.

UJJAYI

Figure 27

Step 1 - Sit in a comfortable meditative posture like padmasana, siddhasana or Vajrasana.

Step 2 - Keep the spine erect and eyes gently closed.

Step 3 - Inhale deeply and exhale slowly feeling the breath at the throat region.

Step 4 - The inhalation and exhalation should be complete.

Step 5 - Bout the inhalation and exhalation should be graceful.

Step 6 - A gentle hissing sound can be heard and felt.

Step 7 - Feel the soothing relaxation.

YOGA NIDRA

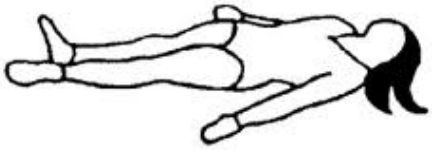


Figure 28

Step 1 - Lie down comfortably in savasana, with the arms and the feet slightly apart and eyes gently closed.

Step 2 - Become aware of the slow steady gentle breathing co-ordinate with the abdominal movements.

RELAXATIONS

- Become aware of the whole body which is resting comfortably and beginning to relax.
- Listen to the few rounds of “Om kar” chanting feeling the relaxation and resonance.

RESOLVE

- Time for making a resolve.

ROTATION OF CONCIOUSNESS

- Rotation of the awareness on the body parts – right side, left side, back, front and major parts.

BRETAHING

- Counting of breath in descending order and relaxing more with each count down.

IMAGE VISUALIZATION

- Taking the awareness away from the body and visualizing a few relaxing imageries.

RESOLVE REPEATATION

- Repeat the resolve with Shraddha.

FINISH

- Bring the feet together. Palms by the side of the body. Gently roll over to one side and sit up in any comfortable position and finish the practice with Om kar chanting followed by a prayer. Gently open the eyes.

3.13.2 SURYANAMASKAR

Pranamasana

Figure 29

- Stand upright and relaxed with hands folded.
- Breathing Normal
- Chant Om Kameshvaryai Namaha

Hastautthasasana

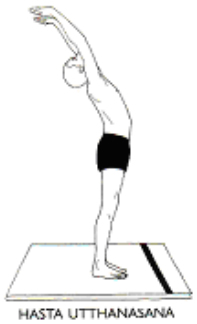


Figure 30

- Bend head and body back with arms raised
- Breathing Inhale
- Chant Om Bhagamalinyai Namaha

Padahastanasana

Figure 31

- Bend forward palms on the floor knees locked.
- Breathing exhale
- Chant Om Nityaklinnayi Namaha

Ashwasanchalasana

Figure 32

- Right foot back and left foot forward between hands
- Chant Om Bherudayai namaha
- Breath inhale

Parvatasana

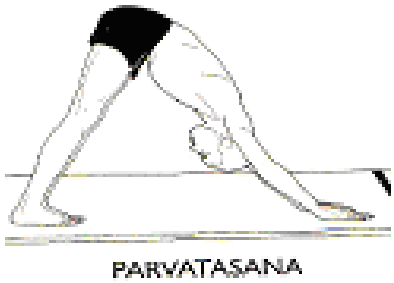


Figure 33

- Press palms on the floor raise hips at angle with the floor
- Chant Om Vajreshvaryai namaha
- Breath Exhale

Ashtanga Namaskar

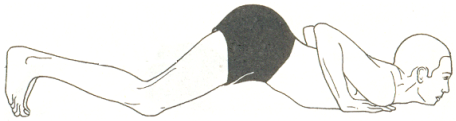


Figure 34

- Drop knees chest and chin on the floor, hip little up.
- Chant Om Dutyai Namaha
- Breath outside Breath retain

Bhujangasana

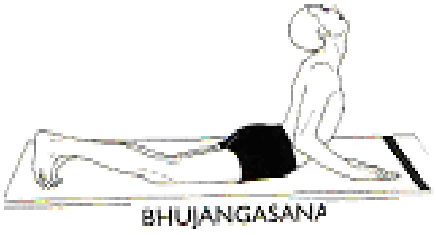


Figure 35

- Lift the head up and bend all the way back
- Om Tvaritayai Namah
- Breath inhale

Parvatasana

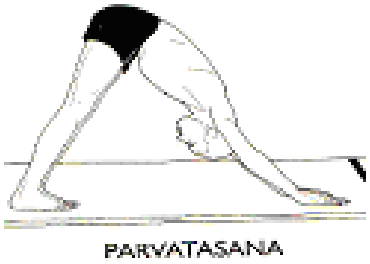


Figure 36

- Press palms on the floor, raise hips at angle with the floor.
- Om kulasundaryai Nanaha
- Breath exhale

Ashwasanchalasana

Figure 37

- Right foot back and left foot forward between hands
- Om Nithyayi Namaha
- Breath inhale

Padahastanasana

Figure 38

- Bend forward palms on the floor knees locked.
- Om Vijayayai Namaha
- Breath inhale

Hastautthanasana

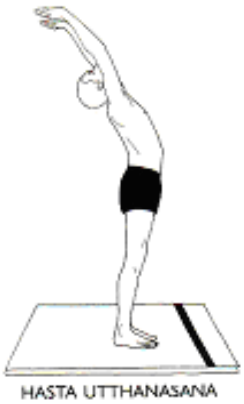


Figure 39

- Bend head and body back with arms raised
- Om Sarvamangalayai Namaha
- Breath inhale

Pranamasana

Figure 40

- Stand upright and relaxed with hands folded.
- Om Jvalamalininyai Namaha
- Breath exhale

3.14 TEST ADMINISTRATION

The following criterion measures were chosen for testing hypothesis.

3.14.1 SOCIO ENVIRONMENTAL VARIABLES

3.14.1.1 SEDENTARY BEHAVIOR

Purpose	:	To ascertain the sedentary behavior level
Equipment used	:	S**edentary behavior questionnaire (SBQ) developed by by James F. Sallis (2010)**
Procedure	:	The Sedentary behavior questionnaire (SBQ) for pre teen girls is a self-administered, recall instrument. It was developed to assess general levels of screen timing throughout the school year for students in grades 4 to 8 and approximately 8 to 14 years of age. The SBQ can be administered in a classroom setting and provides a summary of screen timing score derived from nine items, each scored on a 9-point scale. Estimated completion time is 10 minutes. On atypical, how much time do you

spend (from when you wake up until you go to bed) doing the following.

Scoring : Overall process - Find screen timing score between 1 and 9 for each item. Questions 1 to 9 the answers for each item start from the lowest activity response and progress to the highest activity response. Use the reported value that is checked off for each item (the lowest activity response being a 1 and the highest activity response being a 5). Once you have a value from 1 to 9 for each of the 9 items (items 1 to 9) used in the sedentary behavior score, you simply total the score of these 9 items, which results in the final SBQ activity summary score

Response Value **:** A score of 1 indicates low sedentary behavior, whereas a score of 9 indicates high sedentary behavior.

3.14.1.2 PHYSICAL ACTIVITY

Objective : To ascertain the physical activity level

Equipment used : **The Physical Activity Questionnaire for Children (PAQ- C) Manual by Kowalski, K., Crocker, P., & Donen, R. (1997)**

Procedure : The Physical Activity Questionnaire for Children is a self-administered, 7-day recall instrument. It was developed to assess general levels of physical activity throughout the school year for students in grades 4 to 8 and approximately 8 to 14 years of age. The PAQ-C can be administered in a classroom setting and provides a summary of physical activity score derived from nine items, each scored on a 5-point scale. Estimated completion time is 20 minutes.

Scoring : Overall process - Find an activity score between 1 and 5 for each item (excluding item 10) **Item 1** Spare Time

Activity Take the mean of all activities ("no" activity being a 1, "7 times or more" being a 5) on the activity checklist to form a composite score for item 1. 2) **Item 2 to 8** (PE, recess, lunch, right after school, evening, weekends, and describes you best). The answers for each item start from the lowest activity response and progress to the highest activity response. Use the reported value that is checked off for each item (the lowest activity response being a 1 and the highest activity response being a 5). 3) **Item 9** Take the mean of all days of the week ("none" being a 1, "very often" being a 5) to form a composite score for item 9. 4) **Item 10** Can be used to identify students who had unusual activity during the previous week, but this question is NOT used as part of the summary activity score.5) How to calculate the final PAQ-C activity score Once you have a value from 1 to 5 for each of the 9 items (items 1 to 9) used in the Physical Activity composite score, you simply take the mean of these 9 items, which results in the final PAQ-C activity summary score.

Response Value **:** A score of 1 indicates low physical activity, whereas a score of 5 indicates high physical activity.

3.14.1.3 FAMILY COHESION

Objective : To ascertain the Family cohesion level

Equipment used : **Family Cohesion by Moos, R. H. (1974)**

Procedure : The Family Cohesion scale is a nine item scale intended to measure the degree of commitment, help, and support family members provide for one another. Items are presented as descriptive statements. Respondents rate these statements as mostly true or mostly false about their family.

Scoring **:** Overall process - Find a family environment score between 1 and 9 for each item. Questions 1 to 9 the

answers for each item start from the lowest cohesive family environment and progress to the highest cohesive family environment. Use the reported value that is checked off for each item. Once you have a value from 1 to 9 for each of the 9 items (items 1 to 9) used in the family environment score, you simply total the score of these 9 items, which results in the final FES activity summary score. Responses categories: 0=Mostly True and 1= Mostly False

Response Value **:** Reverse coding is necessary. Items 1, 3, 4, 6, 8, and 9 are reverse coded. Responses are summed to create a total score. A higher score indicates a more cohesive family cohesion.

3.14.1.4 EATING ATTITUDE

Objective : To ascertain the eating attitude level

Equipment used : **Children's Eating Attitude Test (ChEAT) by Garner et.al. (1982)**

Procedure : Children's Eating Attitudes Test (ChEAT): A modified version of the Eating Attitudes Test (EAT). It asks about perceived body image, obsessions/preoccupation with food, and dieting practices. There are 26 questions; each question is rated with a 6 point Likert-type scale with responses always, very often, often, sometimes, rarely and never. The EAT was modified so that it is comprehensible for children as young as 8. The instructions on how to complete the questionnaire are given orally to the child. It is easy to administer and takes about 30 minutes to complete. It measures attitudes toward eating and dietary behavior.

Scoring **:** Validity testing of the ChEAT confirms recoding scores such that the least three symptomatic answers (never, rarely, sometimes) are recoded as 0, with often=1,

usually=2, and the most symptomatic score, always, coded as 3. Thus, the total ChEAT score may range from 0–78

Response Value **:** Children, who had tried to lose weight, felt too fat and thought that their friends would like them more if they were thinner, had significantly higher total scores on the ChEAT.

3.14.2 PUBERTAL DEVELOPMENT DIMENSION

3.14.2.1 DEHYDROEPIANDROSTERONE (DHEA)

Objective : To test DHEA levels in pre teen girls

Equipment used : Syringe, Cotton, Blood collector tube, elastic band (tourniquet) by **Salek. FS, (2002)**

Procedure : A health professional will draw the blood from a vein After cleaning the skin surface with antiseptic and placing an elastic band (tourniquet) around the upper arm to apply pressure and cause the veins to swell with blood. A needle is inserted into a vein (usually in the arm inside of the elbow or on the back of the hand) and blood is withdrawn and collected in a vial or syringe. After the procedure, the elastic band is removed. Once the blood has been collected, the needle is removed and the area is covered with cotton or a bandage to stop the bleeding. Collecting the blood for the test will only take a few minutes. The sample will then be analyzed for DHEA levels.

Scoring : DHEA normal level in puberty girls is 145 to 395 ug/dl (ug/dl stands for micrograms per deciliter)

3.14.2.2 LUTEINIZING HORMONE (LH)

Objective	:	To test the LH test in preteen girls
Equipment used	:	Syringe, Cotton, Blood collector tube, elastic band (tourniquet) by **Kaplan. LA, (1996)**
Procedure	:	A health professional will draw the blood from a vein After cleaning the skin surface with antiseptic and placing an elastic band (tourniquet) around the upper arm to apply pressure and cause the veins to swell with blood. A needle is inserted into a vein (usually in the arm inside of the elbow or on the back of the hand) and blood is withdrawn and collected in a vial or syringe. After the procedure, the elastic band is removed. Once the blood has been collected, the needle is removed and the area is covered with cotton or a bandage to stop the bleeding. Collecting the blood for the test will only take a few minutes. The sample will then be analyzed for LH levels
Scoring	:	Normal LH levels for puberty girls 1.8 to 8.6 IU/L. (IU/L stands for international unit per liter)

3.14.2.3 GONADOTROPHIN RELEASING HORMONE (GNRH)

Objective	:	To test the GnRH test in preteen girls
Equipment used	:	Syringe, Cotton, Blood collector tube, elastic band (tourniquet) by **Sonis. WA, (1986)**
Procedure	:	A health professional will draw the blood from a vein After cleaning the skin surface with antiseptic and placing an elastic band (tourniquet) around the upper arm to apply pressure and cause the veins to swell with blood. A needle is inserted into a vein (usually in the arm inside of the elbow or on the back of the hand) and blood is

withdrawn and collected in a vial or syringe. After the procedure, the elastic band is removed. Once the blood has been collected, the needle is removed and the area is covered with cotton or a bandage to stop the bleeding. Collecting the blood for the test will only take a few minutes. The sample will then be analyzed for GnRH levels

Scoring : Normal level of GnRH for puberty girls is 1 to 5 iu/L (iu/L stands for International units per liter)

3.14.2.4 FOLLICLE STIMULATING HORMONE (FSH)

Objective : To test the FSH test in preteen girls

Equipment used : Syringe, Cotton, Blood collector tube, elastic band (tourniquet) by **Haymond S, (2006)**

Procedure : A health professional will draw the blood from a vein after cleaning the skin surface with antiseptic and placing an elastic band (tourniquet) around the upper arm to apply pressure and cause the veins to swell with blood. A needle is inserted into a vein (usually in the arm inside of the elbow or on the back of the hand) and blood is withdrawn and collected in a vial or syringe. After the procedure, the elastic band is removed. Once the blood has been collected, the needle is removed and the area is covered with cotton or a bandage to stop the bleeding. Collecting the blood for the test will only take a few minutes. The sample will then be analyzed for FSH levels

Scoring : Normal FSH levels for puberty girls : 0.3 - 10.0 mIU/ml (mIU/ml = milli international units per milliliter)

3.15 COLLECTION OF DATA

The data was collected from 30 preteen pubertal girls. They were divided into three equal groups consisting of 10 subjects at random. First and second experimental groups and Third as control group. Group I –10 Subjects were trained on Static Hatha Yoga Sadhana, Group II –10 subjects were trained on Dynamic Hatha Yoga Sadhana, Group III – 10 subjects treated as the Control group respectively for fifteen weeks (5 days a week). After the practice period all subjects were tested on selected criterion variables at different levels as pre and post practice. During the collection of data due ethical procedure where followed in the presence of the constituted committee.

3.16 STATISTICAL TECHNIQUE

The data obtained were analyzed by Analysis of Covariance (ANCOVA) to assess the significant difference among the groups between the pretest and posttest on socio environmental and pubertal development dimension to find out the effect of static hatha yoga sadhana and dynamic hatha yoga sadhana package among pubertal development dimension preteen girls. The adjusted posttest mean difference among the experimental groups were tested and if the adjusted post test result was significant the Scheffe's post hoc test was used to determine the significance of the paired means difference.

The investigator has analyzed scientific results obtained by application of various methodologies discussed above and the results are analyzed and presented in from of detailed discussion graphs and various tables in the Chapter IV

CHAPTER - IV

ANALYSIS OF THE DATA AND RESULT OF THE STUDY

4.1 OVERVIEW

This chapter deals with the analysis of data collected from the subjects under study. The purpose of this study was to find out the effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development dimension among preteen girls. To achieve the purpose of the study, 30 preteen pubertal girls from Chennai city were selected as subjects. The three groups namely Experimental group I- Static hatha yoga sadhana, Experimental group II - Dynamic hatha yoga sadhana and Group III – Control group, were analyzed with the difference in the values of pre and post test scores on selected Socio environmental variables: Sedentary behavior, Physical activity, Family cohesion, and Eating attitude and Pubertal development dimension: Dehydroepiandrosterone (DHEA), Luteinizing hormone (LH), Gonadotrophin releasing hormone (GnRH), Follicle stimulating hormone (FSH), and control group with SPSS package. The subjects were selected at random by lot and the groups were equated in relation of factors to be examined. The differences between the means of the three groups in the pre test had been taken into account during the analysis of the post test differences the means.

To achieve the purpose of study the final means when adjusted for difference with the initial means and the adjusted means were derived and tested at 0.05 levels of confidences. To test the significances of changes between the means, ANCOVA test was applied. When the post –test means were significant, the Scheffe's Post hoc test was administered to find out the paired means significance difference. Thus the obtained results were interpreted with earlier studies and presented in this chapter well along with tables and graphical applications.

4.2 TEST OF SIGNIFICANCE

This is the vital portion of the dissertation in achieving the conclusion by examining the hypotheses. This procedure of testing the hypothesis was done by accepting the hypothesis or rejecting the same in accordance with the result in relation to the level of confidence fixed at 0.05 level. If the obtained value is greater than the table value, hypotheses were accepted to the effect that there existed significant difference among the means of the groups compared and if the obtained value lesser, than there exists no significant difference between the means.

4.3 LEVEL OF SIGNIFICANCE

The subjects were compared on the effect of different yogic practices on selected socio environmental, pubertal development variables among preteen girls. The Analysis of Covariance (ANCOVA) was used to find out significant difference if any, between the group on selected criterion variables separately. In all the cases, 0.05 level of confidence was fixed to test the significance which was considered as appropriate.

4.4 COMPUTATION OF ANALYSIS OF CO VARIANCE AND SCHEFFE'S POST HOC TEST

The following tables illustrate the statistical result of effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development among preteen girls. The ordered adjusted means and differences between the means of the groups under study were given in the following tables.

4.5 RESULTS ON SEDENTARY BEHAVIOR

The socio-environmental variable sedentary behavior was measured through sedentary behavior questionnaire (SBQ) by James F. Sallis 2010. The result on the effect of static and dynamic hatha yoga sadhana on sedentary behavior among preteen girls is presented in Table V.

Table V

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON SEDENTARY BEHAVIOR OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in numbers)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	62.0	61.6	61.8	**Between**	0.8	2	0.4	0.01
				Within	1146	27	42.44	
Post Test Mean	46.8	44.4	62.2	**Between**	1865.86	2	932.93	**32.82***
				Within	767.6	27	28.42	
Adjusted Post Test Mean	46.81	44.39	62.2	**Between**	1866.19	2	933.09	**31.67***
				Within	766.06	26	29.46	
Mean Diff	15.2	17.2	0.4					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table V shows that the pre test mean scores of Sedentary behavior of Experimental group I – Static hatha yogic sadhana was 62.0, Experimental group II – Dynamic hatha yogic sadhana was 61.6, Control group III was 61.8. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 46.8, 44.4 and 62.2 respectively.

The obtained F value on pre test scores 0.01 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 32.82 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 31.67 was greater than the required F value at 3.37. This proved that there was a significant reduction in sedentary behavior due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table VI.

TABLE - VI

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF SEDENTARY BEHAVIOR

(Scores in numbers)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean difference**	**Required C.I**
46.81	--	62.20	15.39*	6.30
--	44.39	62.20	17.81*	6.30
46.81	44.39	--	2.41	6.30

***** Significant at .05 level

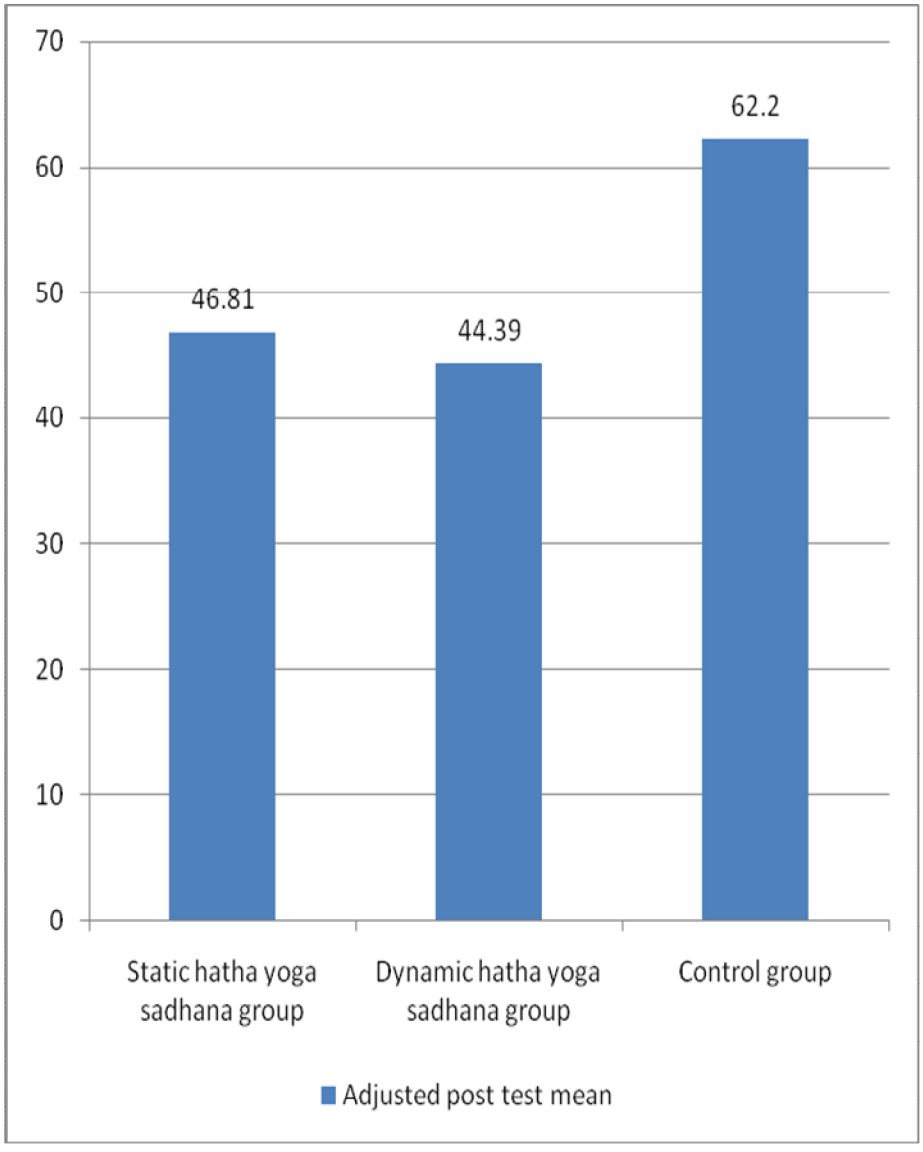
Table-VI shows that there was significant difference between Static hatha yogic sadhana and control group and Dynamic hatha yogic sadhana group and control group and there was no significant difference between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 41.

FIGURE - 41

BAR DIAGRAM SHOWING THE ADJUSTED POST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON SEDENTARY BEHAVIOR

(Scores in numbers)



4.5.1 DISCUSSIONS ON THE FINDINGS OF SEDENTARY BEHAVIOR

The results presented in Table V showed that the obtained adjusted means on sedentary behavior among Static hatha yoga sadhana group was 46.81 followed by Dynamic hatha yoga sadhana group with the mean value of 44.39 and control group mean value of 62.2. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.01, 32.82 and 31.67 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant reduction in sedentary behavior than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was no significant difference in the reduction of sedentary behavior among pre teen girls.

4.6 RESULTS ON PHYSICAL ACTIVITY

The socio-environmental variable physical activity was measured through Physical Activity Questionnaire for Children (PAQ-C) Manual by Kowalski, K., Crocker, P., & Donen, R.(1997). The result on the effect of static and dynamic hatha yoga sadhana on physical activity among preteen girls is presented in Table VII.

Table VII

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON PHYSICAL ACTIVITY OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in numbers)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	16.1	16.7	16.2	**Between**	2.06	2	1.03	0.14
				Within	202.6	27	7.50	
Post Test Mean	27.8	33.5	16.3	**Between**	1535.26	2	767.63	**50.53***
				Within	410.2	27	15.19	
Adjusted Post Test Mean	27.77	33.53	16.28	**Between**	1535.56	2	767.78	**48.87***
				Within	408.44	26	15.70	
Mean Diff	11.7	16.8	0.1					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26 (df) = 3.37

Table VII shows that the pre test mean scores of Physical activity of Experimental group I – Static hatha yogic sadhana was 16.1, Experimental group II – Dynamic hatha yogic sadhana was 16.7, Control group III was 16.2. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 27.8, 33.5 and 16.3 respectively.

The obtained F value on pre test scores 0.14 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 50.53 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 48.87 was greater than the required F value at 3.37. This proved that there was a significant improvement in the participation of physical activity due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among pre teen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table VIII.

TABLE - VIII

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF PHYSICAL ACTIVITY

(Scores in numbers)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean difference**	**Required C.I**
27.64	--	16.34	11.30*	4.58
--	33.62	16.34	17.28*	4.58
27.64	33.62	--	5.97*	4.58

***** Significant at .05 level

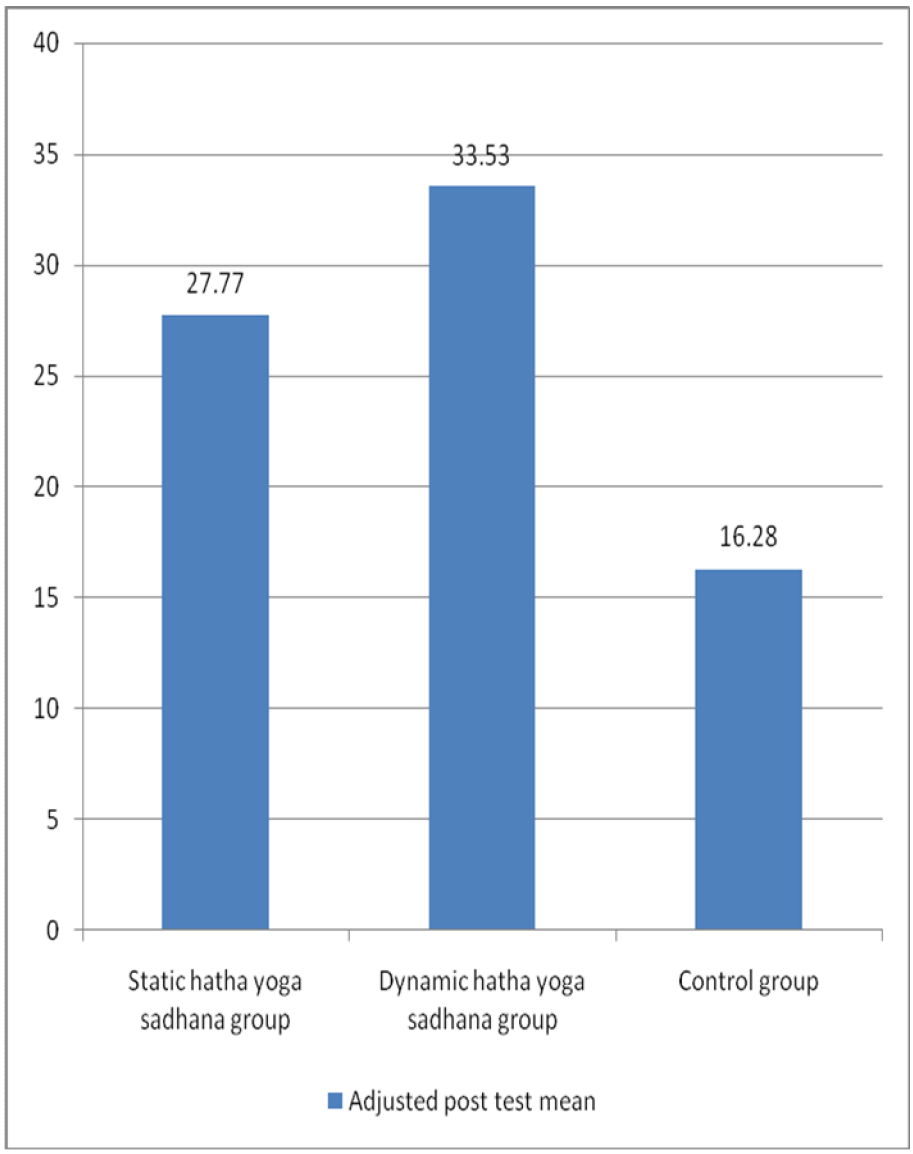
Table-VIII shows that there was significant difference between Static hatha yogic sadhana and control group, Dynamic hatha yogic sadhana group and control group and between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 42.

FIGURE - 42

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON PHYSICAL ACTIVITY

(Scores in numbers)



4.6.1 DISCUSSIONS ON THE FINDINGS OF PHYSICAL ACTIVITY

The results presented in Table VII showed that the obtained adjusted means on physical activity among Static hatha yoga sadhana group was 27.77 followed by Dynamic hatha yoga sadhana group with the mean value of 33.53 and control group mean value of 16.28. The difference among pre test scores Post test scores and adjusted mean cores of the subjects were statistically treated using ANCOVA and F values obtained were 0.14, 50.53 and 48.87 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant improvement in physical activity than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was significant difference in the improvement in the participation of physical activity. And it was proved that the dynamic hatha yoga sadhana was better than static hatha yoga sadhana in improving the participation in physical activity.

4.7 RESULTS ON FAMILY COHESION

The socio-environmental variable family cohesion was measured through Family Cohesion by Moos, R. H. (1974). The result on the effect of static and dynamic hatha yoga sadhana on family cohesion among preteen girls is presented in Table IX.

Table IX

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON FAMILY COHESION OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in numbers)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	3.4	3.1	3	**Between**	0.86	2	0.43	0.43
				Within	27.3	27	1.01	
Post Test Mean	6	7.2	3.3	**Between**	79.8	2	39.9	**49.65***
				Within	21.7	27	0.80	
Adjusted Post Test Mean	5.8	7.2	3.37	**Between**	76.37	2	38.18	**59.81***
				Within	16.6	26	0.64	
Mean Diff	2.6	4.1	0.3					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table IX shows that the pre test mean scores of Family cohesion of Experimental group I – Static hatha yogic sadhana was 3.4, Experimental group II – Dynamic hatha yogic sadhana was 3.1, Control group III was 3. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 6, 7.2 and 3.3 respectively.

The obtained F value on pre test scores 0.43 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 49.65 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 59.81 was greater than the required F value at 3.37. This proved that there was a significant improvement in the family cohesion due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table X.

TABLE - X

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF FAMILY COHESION

(Scores in numbers)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean difference**	**Required C.I**
5.90	--	3.37	2.53*	0.93
--	7.23	3.37	3.86*	0.93
5.90	7.23	--	1.33*	0.93

***** Significant at .05 level

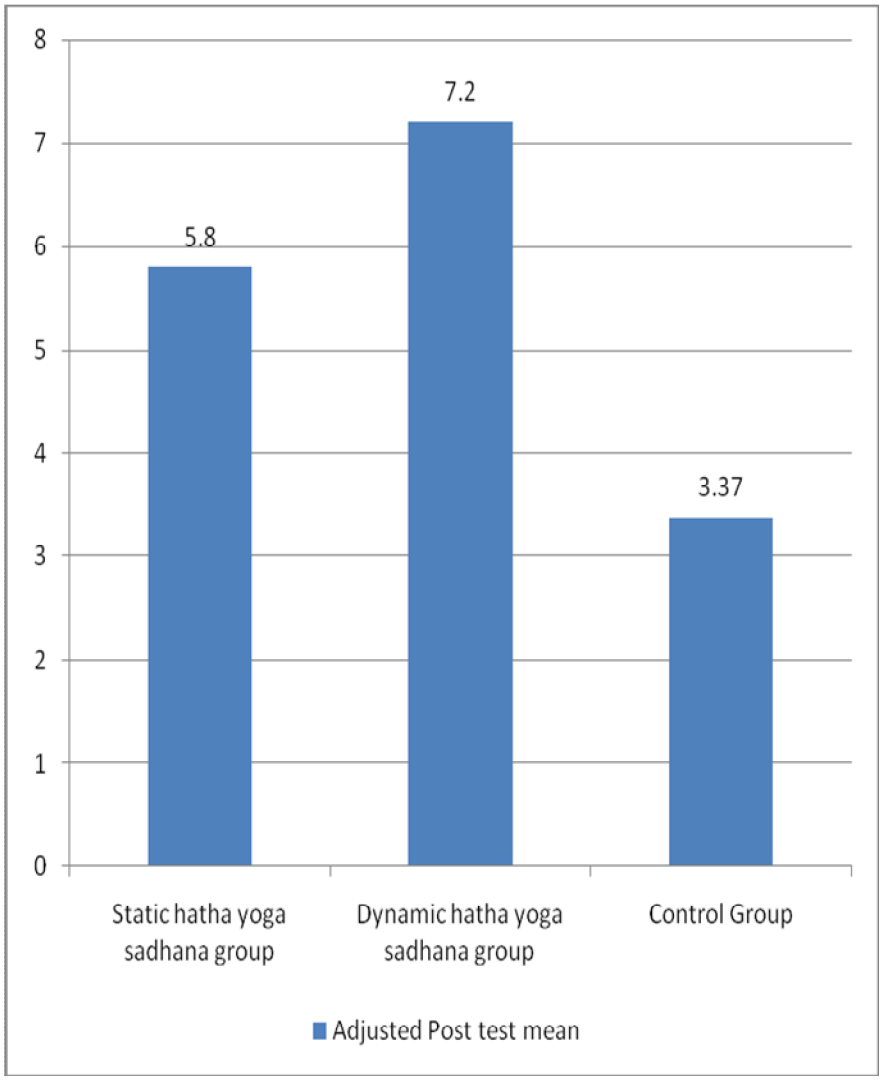
Table-X shows that there was significant difference between Static hatha yogic sadhana and control group, Dynamic hatha yogic sadhana group and control group and between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 43.

FIGURE - 43

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON FAMILY COHESION

(Scores in numbers)



4.7.1 DISCUSSIONS ON THE FINDINGS OF FAMILY COHESION

The results presented in Table IX showed that the obtained adjusted means on family cohesion among Static hatha yoga sadhana group was 5.8 followed by Dynamic hatha yoga sadhana group with the mean value of 7.2 and control group mean value of 3.37. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.43, 49.65 and 59.81 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant improvement in family cohesion than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was significant difference in the improvement of family cohesion and it was proved that Dynamic hatha yoga sadhana was better than Static hatha yoga sadhana in improving the family cohesion.

4.8 RESULTS ON EATING ATTITUDE

The socio-environmental variable eating attitude was measured through Children's Eating Attitude Test (ChEAT) by Garner et al. (1982). The result on the effect of static and dynamic hatha yoga sadhana on eating attitude among preteen girls is presented in Table XI.

Table XI

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON EATING ATTITUDE OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in numbers)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	33.5	34	33.8	**Between**	1.26	2	0.6	0.01
				Within	1202.1	27	44.5	
Post Test Mean	55.7	62.4	33.9	**Between**	4441.27	2	2220.63	**72.82***
				Within	823.4	27	30.49	
Adjusted Post Test Mean	55.65	62.43	33.90	**Between**	4444.07	2	2222.04	**73.23***
				Within	788.88	26	30.34	
Mean Diff	22.2	28.4	0.1					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table XI shows that the pre test mean scores of Eating attitude of Experimental group I – Static hatha yogic sadhana was 33.5, Experimental group II – Dynamic hatha yogic sadhana was 34, Control group III was 33.8. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 55.7, 62.4 and 33.9 respectively.

The obtained F value on pre test scores 0.01 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 72.82 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 73.23 was greater than the required F value at 3.37. This proved that there was a significant improvement in the eating attitude due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table XII.

TABLE - XII

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF EATING ATTITUDE

(Scores in numbers)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean Difference**	**Required C.I**
55.65	--	33.91	21.75*	6.40
--	62.44	33.91	28.53*	6.40
55.65	62.44	--	6.78*	6.40

***** Significant at .05 level

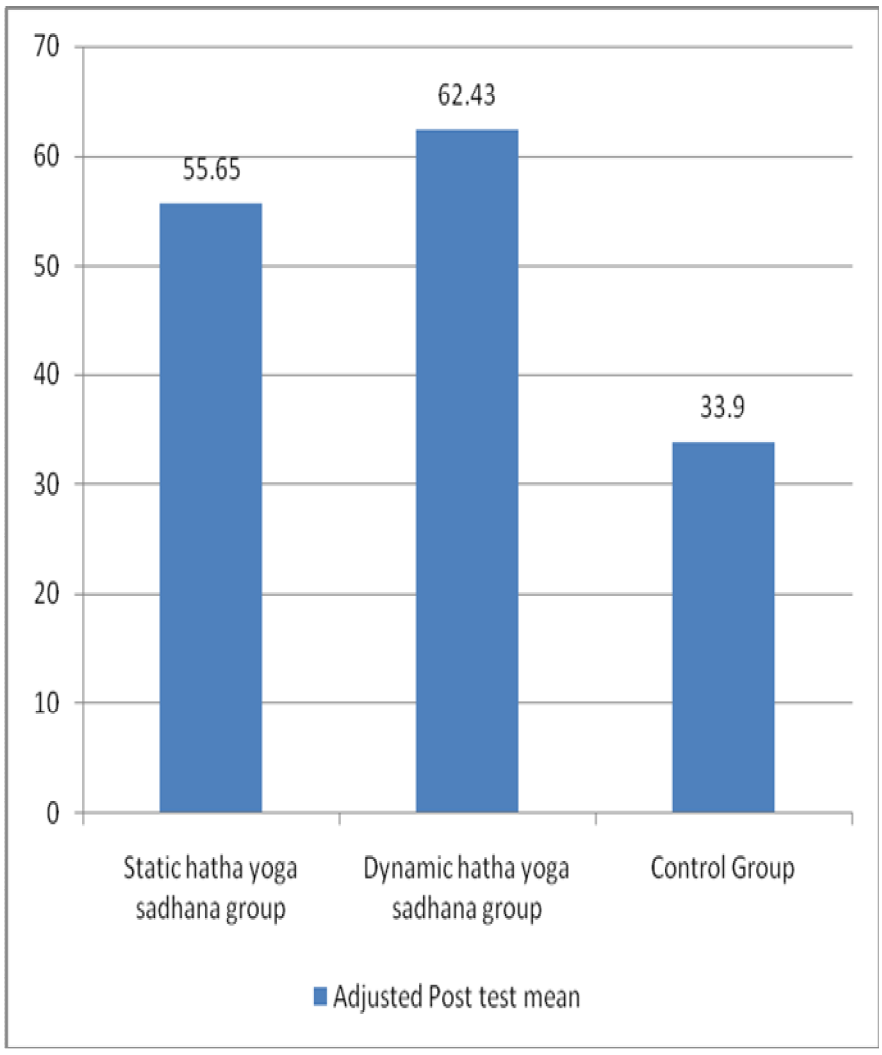
Table-XII shows that there was significant difference between Static hatha yogic sadhana and control group, Dynamic hatha yogic sadhana group and control group and between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 44.

FIGURE - 44

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON EATING ATTITUDE

(Scores in numbers)



4.8.1 DISCUSSIONS ON THE FINDINGS OF EATING ATTITUDE

The results presented in Table XI showed that the obtained adjusted means on eating attitude among Static hatha yoga sadhana group was 55.65 followed by Dynamic hatha yoga sadhana group with the mean value of 62.43 and control group mean value of 33.90. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.01, 72.82 and 73.23 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant improvement in eating attitude than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was significant difference in the improvement of eating attitude and it was proved that Dynamic hatha yoga sadhana was better than Static hatha yoga sadhana in improving the eating attitude.

4.9 RESULTS ON DEHYDROEPIANDROSTERONE (DHEA)

The Pubertal development dimension variable Dehydroepiandrosterone (DHEA) was measured through blood test. The result on the effect of static and dynamic hatha yoga sadhana on Dehydroepiandrosterone (DHEA) among preteen girls is presented in Table XIII.

Table XIII

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON DEHYDROEPIANDROSTERONE (DHEA) OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in ug/dl)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	148.3	147.4	147.3	**Between**	6.06	2	3.03	0.65
				Within	126.6	27	4.69	
Post Test Mean	173.4	180.4	149.1	**Between**	5397.27	2	2698.63	**73.18***
				Within	995.7	27	36.88	
Adjusted Post Test Mean	172.63	180.72	149.55	**Between**	5205.02	2	2602.51	**83.68***
				Within	808.61	26	31.10	
Mean Diff	25.1	33	1.8					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table XIII shows that the pre test mean scores of Dehydroepiandrosterone (DHEA) of Experimental group I – Static hatha yogic sadhana was 148.3, Experimental group II – Dynamic hatha yogic sadhana was 147.4, Control group III was 147.3. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 173.4, 180.4 and 149.1 respectively.

The obtained F value on pre test scores 0.65 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 73.18 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 83.68 was greater than the required F value at 3.37. This proved that there was a significant improvement in Dehydroepiandrosterone (DHEA) due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table XIV.

TABLE - XIV

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF DEHYDROEPIANDROSTERONE (DHEA)

(Scores in ug/dl)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean Difference**	**Required C.I**
172.63	--	149.55	23.08*	6.47
--	180.72	149.55	31.18*	6.47
172.63	180.72	--	8.09*	6.47

***** Significant at .05 level

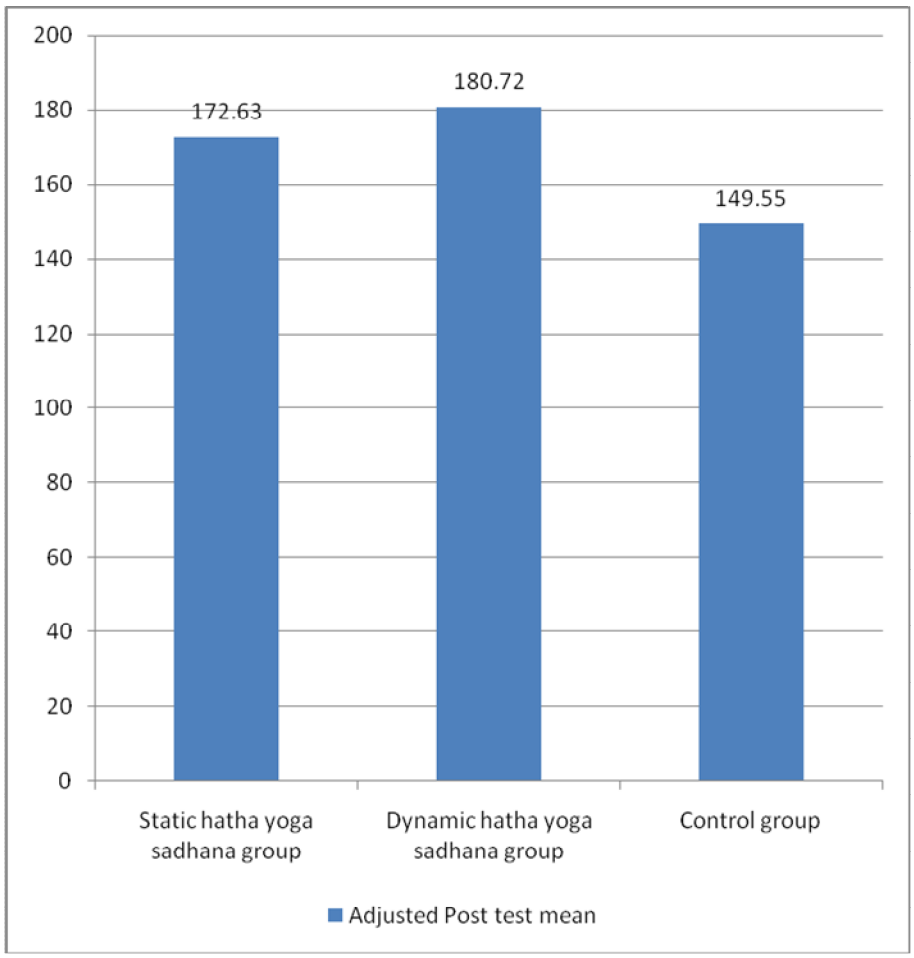
Table-XIV shows that there was significant difference between Static hatha yogic sadhana and control group, Dynamic hatha yogic sadhana group and control group and between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 45.

FIGURE - 45

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON DEHYDROEPIANDROSTERONE (DHEA)

(Scores in ug/dl)



4.9.1 DSCUSSIONS ON THE FINDINGS OF DEHYDROEPIANDROSTERONE (DHEA)

The results presented in Table XIII showed that the obtained adjusted means on Dehydroepiandrosterone (DHEA) among Static hatha yoga sadhana group was 172.63 followed by Dynamic hatha yoga sadhana group with the mean value of 180.72 and control group mean value of 149.55. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.65, 73.18 and 83.68 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant improvement in Dehydroepiandrosterone (DHEA) than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was significant difference in the improvement of Dehydroepiandrosterone (DHEA) and it was proved that Dynamic hatha yoga sadhana was better than Static hatha yoga sadhana among preteen girls.

4.10 RESULTS ON LUTEINIZING HORMONE (LH)

The Pubertal development dimension variable Luteinizing hormone (LH) was measured through Blood test. The result on the effect of static and dynamic hatha yoga sadhana on Luteinizing hormone (LH) among preteen girls is presented in Table XV.

Table XV

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON LUTEINIZING HORMONE (LH) OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in IU/L)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	Df	Mean Squares	Obtained F
Pre Test Mean	8.14	8	8.04	**Between**	0.10	2	0.05	0.59
				Within	2.36	27	0.09	
Post Test Mean	7.15	6.91	7.85	**Between**	4.77	2	2.39	**17.32***
				Within	3.72	27	0.14	
Adjusted Post Test Mean	7.07	6.96	7.86	**Between**	4.85	2	2.42	**37.64***
				Within	1.68	26	0.06	
Mean Diff	0.99	1.09	0.19					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table XV shows that the pre test mean scores of Luteinizing hormone (LH) of Experimental group I – Static hatha yogic sadhana was 8.14, Experimental group II – Dynamic hatha yogic sadhana was 8, Control group III was 8.04. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 7.15, 6.91 and 7.85 respectively.

The obtained F value on pre test scores 0.59 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 17.32 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 37.64 was greater than the required F value at 3.37. This proved that there was a significant reduction in Luteinizing hormone (LH) due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table XVI.

TABLE - XVI

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF LUTEINIZING HORMONE (LH)

(Scores in IU/L)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean difference**	**Required C.I**
7.08	--	7.87	0.79*	0.29
--	6.97	7.87	0.90*	0.29
7.08	6.97	--	0.11	0.29

***** Significant at .05 level

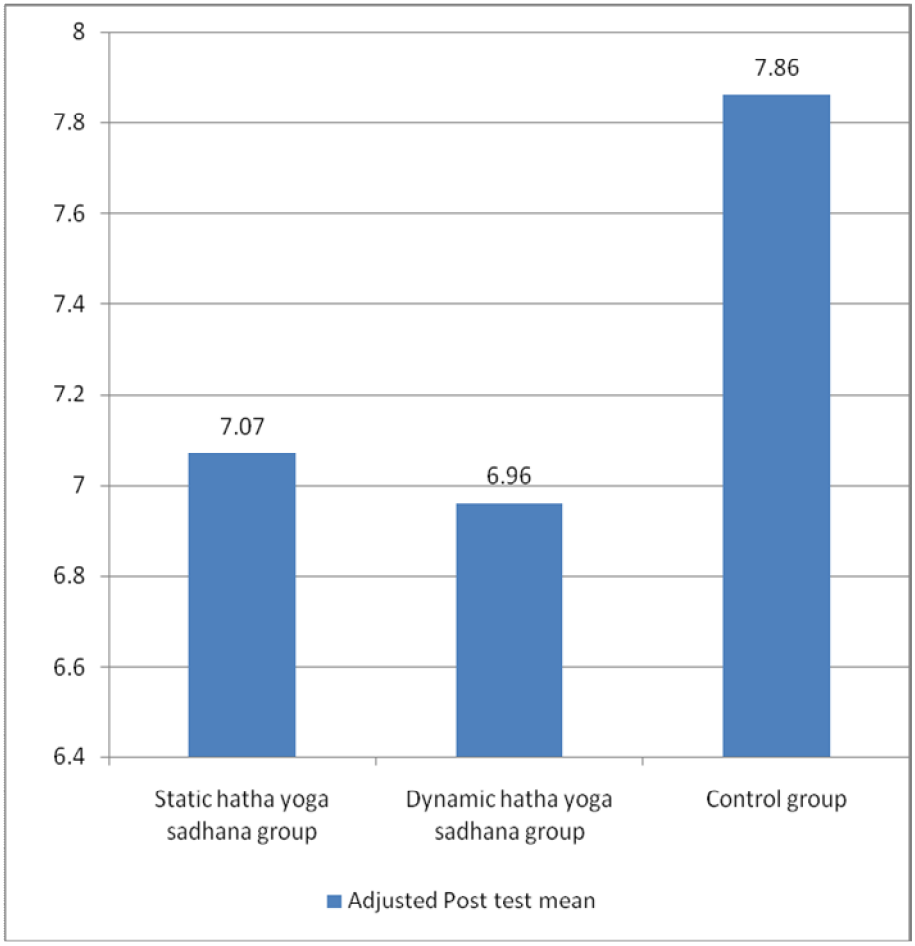
Table-XVI shows that there was significant difference between Static hatha yogic sadhana and control group and Dynamic hatha yogic sadhana group and control group and there was no significant difference between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 46.

FIGURE - 46

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON LUTEINIZING HORMONE (LH)

(Scores in IU/L)



4.10.1 DISCUSSIONS ON THE FINDINGS OF LUTEINIZING HORMONE(LH)

The results presented in Table XV showed that the obtained adjusted means on Luteinizing hormone (LH) among Static hatha yoga sadhana group was 7.07 followed by Dynamic hatha yoga sadhana group with the mean value of 6.96 and control group mean value of 7.86. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.59, 17.32 and 37.64 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant reduction in Luteinizing hormone (LH) than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was no significant difference in the reduction of Luteinizing hormone (LH) among preteen girls.

4.11 RESULTS ON GONADOTROPHIN RELEASING HORMONE (GnRH)

The Pubertal development dimension variable Gonadotrophin releasing hormone (GnRH) was measured through Blood test. The result on the effect of static and dynamic hatha yoga sadhana on Gonadotrophin releasing hormone (GnRH) among preteen girls is presented in Table XVII.

Table XVII

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON GONADOTROPHIN RELEASING HORMONE (GnRH) OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in IU/I)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	1.37	1.48	1.41	**Between**	0.06	2	0.03	0.51
				Within	1.63	27	0.06	
Post Test Mean	2.12	2.25	1.47	**Between**	3.49	2	1.75	**22.22***
				Within	2.12	27	0.08	
Adjusted Post Test Mean	2.16	2.21	1.48	**Between**	3.31	2	1.66	**33.61***
				Within	1.28	26	0.04	
Mean Diff	0.75	0.77	0.06					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table XVII shows that the pre test mean scores of Gonadotrophin releasing hormone (GnRH) of Experimental group I – Static hatha yogic sadhana was 1.37, Experimental group II – Dynamic hatha yogic sadhana was 1.48, Control group III was 1.41. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 2.12, 2.25 and 1.47 respectively.

The obtained F value on pre test scores 0.51 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 22.22 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 33.61 was greater than the required F value at 3.37. This proved that there was a significant reduction in Gonadotrophin releasing hormone (GnRH) due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table XVIII

TABLE - XVIII

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF GONADOTROPHIN RELEASING HORMONE (GnRH)

(Scores in IU/I)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean difference**	**Required C.I**
2.16	--	1.48	0.68*	0.26
--	2.21	1.48	0.73*	0.26
2.16	2.21	--	0.05	0.26

***** Significant at .05 level

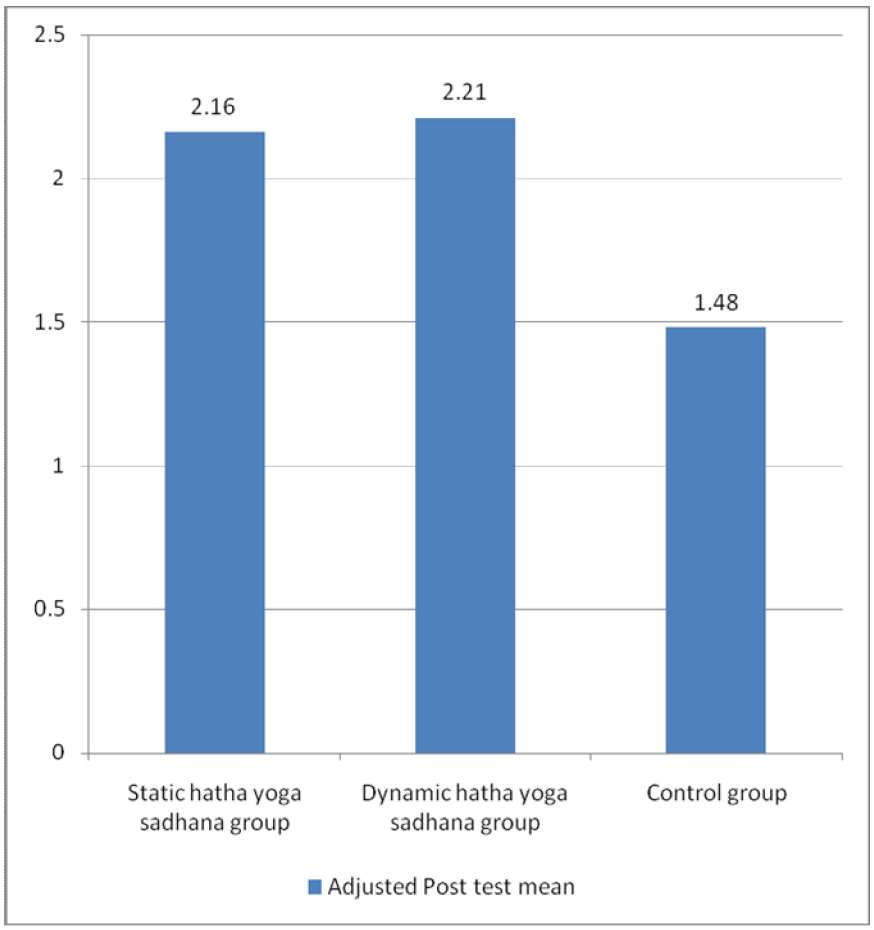
Table-XVIII shows that there was significant difference between Static hatha yogic sadhana and control group, Dynamic hatha yogic sadhana group and control group and there was no significant difference between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 47.

FIGURE - 47

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON GONADOTROPHIN RELEASING HORMONE (GnRH)

(Scores in IU/I)



4.11.1 DISCUSSIONS ON THE FINDINGS OF GONADOTROPHIN RELEASING HORMONE (GnRH)

The results presented in Table XVII showed that the obtained adjusted means on Gonadotrophin releasing hormone (GnRH) among Static hatha yoga sadhana group was 2.16 followed by Dynamic hatha yoga sadhana group with the mean value of 2.21 and control group mean value of 1.48. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.51, 22.22 and 33.61 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant reduction in Gonadotrophin releasing hormone (GnRH) than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was significant difference in the reduction of Gonadotrophin releasing hormone (GnRH) and it was proved that Dynamic hatha yoga sadhana was better than Static hatha yoga sadhana among preteen girls.

4.12 RESULTS ON FOLLICLE STIMULATING HORMONE (FSH)

The Pubertal development dimension variable Follicle stimulating hormone (FSH) was measured through Blood test. The result on the effect of static and dynamic hatha yoga sadhana on Follicle Stimulating Hormone (FSH) among preteen girls is presented in Table V.

Table XIX

COMPUTATION OF ANALYSIS OF COVARIANCE FOR PRE AND POST – TESTS DATA ON FOLLICLE STIMULATING HORMONE (FSH) OF EXPERIMENTAL AND CONTROL GROUPS

(Scores in mIU/ml)

	Static Hatha Yoga Sadhana Group	Dynamic Hatha Yoga Sadhana Group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre Test Mean	8.85	8.76	8.91	**Between**	0.11	2	0.05	0.11
				Within	13.79	27	0.51	
Post Test Mean	6.68	7.71	8.79	**Between**	22.26	2	11.13	**16.47***
				Within	18.25	27	0.67	
Adjusted Post Test Mean	6.67	7.78	8.73	**Between**	21.16	2	10.57	**39.53***
				Within	6.96	26	0.26	
Mean Diff	2.17	1.05	0.12					

*Significant at 0.05 level Table F-ratio at 0.05 level of confidence for 2 and 27 (df) =3.35, 2 and 26(df) = 3.37

Table XIX shows that the pre test mean scores of Follicle stimulating hormone (FSH) of Experimental group I – Static hatha yogic sadhana was 8.85, Experimental group II – Dynamic hatha yogic sadhana was 8.76, Control group III was 8.91. The post test means of Static hatha yogic sadhana, Dynamic hatha yogic sadhana and Control group recorded were 6.68, 7.71 and 8.79 respectively.

The obtained F value on pre test scores 0.11 was lesser than the required F value of 3.35 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal.

The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 16.47 was greater than the required F value at 3.35. This proved that the differences between the post test mean at the subjects were significant.

Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 39.53 was greater than the required F value at 3.37. This proved that there was a significant reduction in the Follicle stimulating hormone (FSH) due to fifteen weeks of Static hatha yogic sadhana and Dynamic hatha yogic sadhana among preteen girls.

Since significant improvement were recorded. The results were subjected to post hoc analysis using Scheffe`s Confidence Interval test. The results were presented in Table XX

TABLE - XX

SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN THE ADJUSTED POST – TEST PAIRED MEANS OF FOLLICLE STIMULATING HORMONE (FSH)

(Scores in mIU/ml)

Experimental Group – I (Static Hatha yogic sadhana**)**	**Experimental Group – II** (Dynamic Hatha yogic sadhana**)**	**Control Group III**	**Mean difference**	**Required C.I**
6.67	--	8.73	2.06*	0.60
--	7.78	8.73	0.94*	0.60
6.67	7.78	--	1.11*	0.60

***** Significant at .05 level

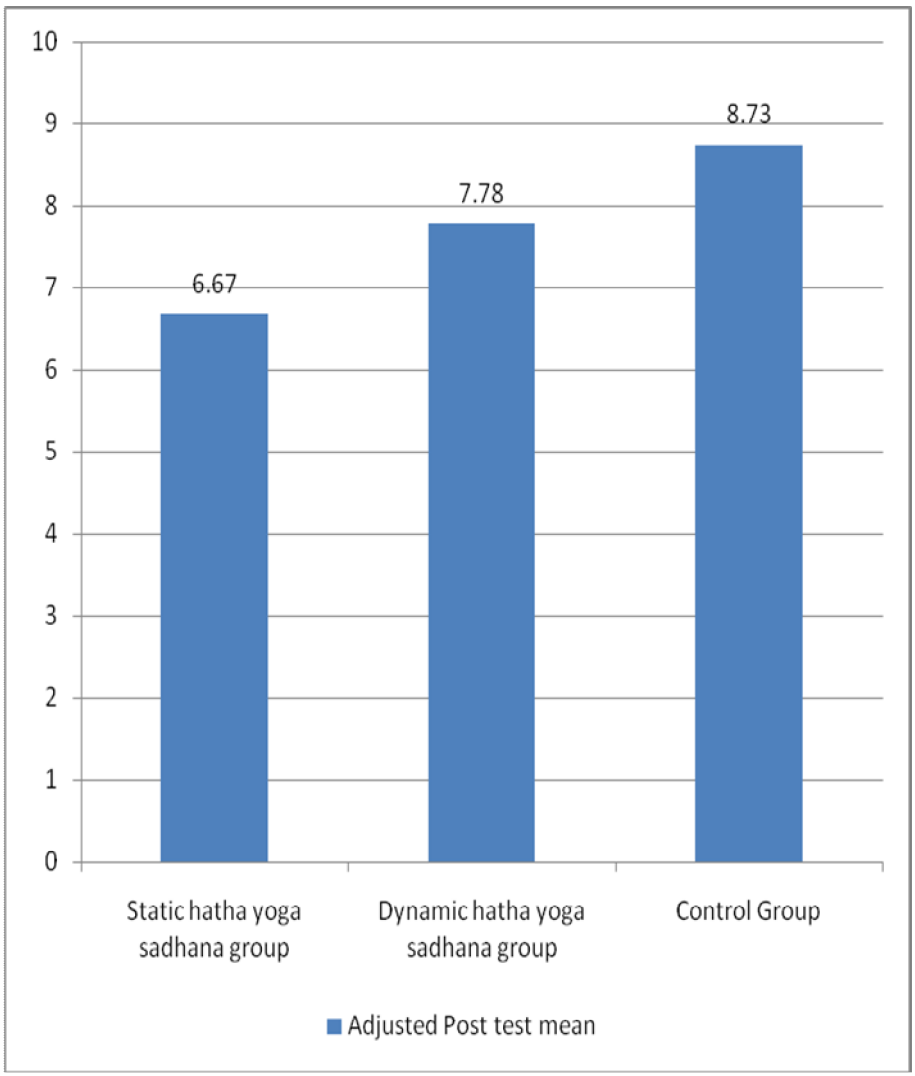
Table - XX shows that there was significant reduction between Static hatha yogic sadhana and control group and Dynamic hatha yogic sadhana group and control group and between experimental groups.

The obtained adjusted post test mean values were presented through bar diagram in Figure 48

FIGURE 48

BAR DIAGRAM SHOWING THE ADJUSTED POST TEST MEAN VALUES OF EXPERIMENTAL GROUPS I, II AND CONTROL GROUP ON FOLLICLE STIMULATING HORMONE (FSH)

(Scores in mIU/ml)



4.12.1 DISCUSSIONS ON THE FINDINGS OF FOLLICLE STIMULATING HORMONE (FSH)

The results presented in Table XIX showed that the obtained adjusted means on Follicle stimulating hormone (FSH) among Static hatha yoga sadhana group was 6.67 followed by Dynamic hatha yoga sadhana group with the mean value of 7.78 and control group mean value of 8.73. The difference among pre test scores Post test scores and adjusted mean scores of the subjects were statistically treated using ANCOVA and F values obtained were 0.11, 16.47 and 39.53 respectively. It was found that obtained F value on pre test score was not significant at 0.05 level of confidence as the obtained value was lesser than the required table value and post test scores was significant at 0.05 level of confidence as the value was greater than the required table F value of 3.35.

The post hoc analysis through Scheffe`s confidence test proved that due to fifteen weeks treatment the Static hatha yoga sadhana and Dynamic hatha yoga sadhana there was significant reduction in Follicle stimulating hormone (FSH) than control group and the differences were significant at 0.05 level. The post hoc analysis between the experimental group namely Static hatha yoga sadhana and Dynamic hatha yoga sadhana proved that there was no significant difference in the reduction of Follicle stimulating hormone (FSH) among preteen girls.

4.13 DISCUSSION ON HYPOTHESES

1) It was hypothesized that there would be a significant reduction in the socio environmental dimension namely 'Sedentary Behavior' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

   According to Table V it was proved that there was significant reduction in the sedentary behavior due to Static and Dynamic hatha yoga sadhana practices and hence the first research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

2) It was hypothesized that there would be a better significant reduction in the socio environmental dimension namely 'Sedentary Behavior' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

   Table VI it was proved that there was no significant difference in reduction of sedentary behavior due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the second research hypothesis was rejected and null hypothesis accepted at 0.05 level of confidence.

3) It was hypothesized that there would be a significant improvement in the socio environmental dimension namely 'Physical Activity' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

   Table VII it was proved that there was significant improvement in the physical activity due to Static and Dynamic hatha yoga sadhana practices and hence the third research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

4) It was hypothesized that there would be a better significant improvement in the socio environmental dimension namely 'Physical Activity' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

   Table VIII it was proved that there was better significant improvement in Physical activity due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the fourth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

5) It was hypothesized that there would be a significant improvement in the socio environmental dimension namely 'Family Cohesion' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

   Table IX it was proved that there was significant improvement in the family cohesion due to Static and Dynamic hatha yoga sadhana practices and hence the fifth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

6) It was hypothesized that there would be a better significant improvement in the socio environmental dimension namely 'Family Cohesion' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

   Table X it was proved that there was better significant improvement in family cohesion due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the sixth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

7) It was hypothesized that there would be a significant improvement in the socio environmental dimension namely 'Eating attitude' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

   Table XI it was proved that there was significant improvement in eating attitude due to Static and Dynamic hatha yoga sadhana practices and hence the seventh research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

8) It was hypothesized that there would be a better significant improvement in the socio environmental dimension namely 'Eating Attitude' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

   Table XII it was proved that there was better significant improvement in eating attitude due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the eighth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

9) It was hypothesized that there would be a significant improvement in the pubertal developmental dimension namely 'Dehydroepiandrosterone (DHEA)' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

Table XIII it was proved that there was significant improvement in the Dehydroepiandrosterone (DHEA) due to Static and Dynamic hatha yoga sadhana practices and hence the ninth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

10) It was hypothesized that there would be a better significant improvement in the pubertal developmental dimension namely 'Dehydroepiandrosterone (DHEA)' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

Table XIV it was proved that there was no significant difference in the improvement of Dehydroepiandrosterone (DHEA) due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the tenth research hypothesis was rejected and null hypothesis accepted at 0.05 level of confidence.

11) It was hypothesized that there would be a significant reduction in the pubertal developmental dimension namely 'Luteinizing Hormone (LH)' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

Table XV it was proved that there was significant reduction in the Luteinizing hormone (LH) due to Static and Dynamic hatha yoga sadhana practices and hence the eleventh research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

12) It was hypothesized that there would be a better significant reduction in the pubertal developmental dimension namely 'Luteinizing Hormone (LH)' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

Table XVI it was proved that there was no significant difference in the reduction of Luteinizing hormone (LH) due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the twelfth research hypothesis was rejected and null hypothesis accepted at 0.05 level of confidence.

13) It was hypothesized that there would be a significant reduction in the pubertal developmental dimension namely 'Gonadotrophin releasing hormone (GnRH)' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

Table XVII it was proved that there was significant reduction in the Gonadotrophin releasing hormone (GnRH) due to Static and Dynamic hatha yoga sadhana practices

and hence the thirteenth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

14) It was hypothesized that there would be a better significant reduction in the pubertal developmental dimension namely 'Gonadotrophin releasing hormone (GnRH)' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

    Table XVIII it was proved that there was better significant reduction in Gonadotrophin releasing hormone (GnRH) due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the fourteenth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

15) It was hypothesized that there would be a significant reduction in the pubertal developmental dimension namely 'Follicle Stimulating Hormone (FSH)' due to Static and Dynamic hatha yoga sadhana practices among preteen girls.

    Table XIX it was proved that there was significant reduction in the Follicle stimulating hormone (FSH) due to Static and Dynamic hatha yoga sadhana practices and hence the fifteenth research hypothesis was accepted and null hypothesis rejected at 0.05 level of confidence.

16) It was hypothesized that there would be a better significant reduction in the pubertal developmental dimension namely 'Follicle Stimulating Hormone (FSH)' due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

    Table XX it was proved that there was no significant difference in the reduction of follicle stimulating hormone (FSH) due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice and hence the sixteenth research hypothesis was rejected and null hypothesis accepted at 0.05 level of confidence.

CHAPTER - V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

The purpose of the study was to find out the effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development dimension among preteen girls. In that, socio-environmental and pubertal development dimension were dependent variables and Static hatha yoga sadhana and Dynamic hatha yogic sadhana was taken as independent variables.

To facilitate this, study (30) thirty preteen girls from Chennai city, were randomly selected as subjects. They were divided into three groups, Experimental Group I (n=10) Static hatha yoga and Experimental Group II (n=10) Dynamic hatha yoga sadhana and Group III - Control group (n=10) No practice was provided

The significance of the difference between the experimental groups I, II and control group – III were found out by the pre test and post test. They were determined through analysis of covariance (ANCOVA). The adjusted post test means were also computed by Scheffe's post hoc test. Thus the following results were obtained after the statistical analysis.

5.2 CONCLUSIONS

Within the limitation and delimitations set for the present study and considering the results obtained, the following conclusion were drawn.

1. The socio-environmental dimension namely 'Sedentary behavior' was significantly reduced due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
2. There was no significant difference in the reduction of 'Sedentary behavior' due to Dynamic hatha yoga sadhana practice and Static hatha yoga sadhana practice among preteen girls.

3. The socio-environmental dimension namely ‘Physical activity’ participation was significantly improved due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
4. There was a better significant difference in the improvement of ‘Physical activity’ participation due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.
5. The socio-environmental dimension namely ‘Family cohesion’ was significantly improved due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
6. There was a better significant difference in the improvement of ‘Family cohesion’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.
7. The socio-environmental dimension namely ‘Eating attitude’ was significantly improved due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
8. There was a better significant difference in the improvement of ‘Eating attitude’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.
9. The pubertal developmental dimension namely ‘Dehydroepiandrosterone (DHEA**)’** was significantly improved due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
10. There was no was significant difference in the improvement of ‘Dehydroepiandrosterone (DHEA)’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.
11. The pubertal developmental dimension namely ‘Luteinizing hormone (LH)’ was significantly reduced due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
12. There was no significant difference in the reduction of ‘Luteinizing hormone (LH)’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

13. The pubertal developmental dimension namely ‘Gonadotrophin releasing hormone (GnRH**)’** was significantly reduced due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
14. There was a better significant difference in the reduction of ‘Gonadotrophin releasing hormone (GnRH**)’** due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.
15. The pubertal developmental dimension namely ‘Follicle stimulating hormone (FSH)’ was significantly reduced due to Static and Dynamic hatha yoga sadhana practices among preteen girls.
16. There was no significant difference in the reduction of ‘Follicle stimulating hormone (FSH)’ due to Dynamic hatha yoga sadhana practice than the Static hatha yoga sadhana practice among preteen girls.

5.3 RECOMMENTATIONS

The following recommendations have been derived on the basis of the study for practitioners.

1. Hatha yoga sadhana may be recommended for preteen girls for all other diseases for better treatment.
2. Hatha yoga sadhana may be recommended mainly for improvement of self confidence among preteen girls.
3. Hatha yoga sadhana can be recommended for psychological variables like Stress, anxiety, depression etcetera can also be studied
4. The government may be encouraged Hatha yoga sadhana as a part of health centers.
5. Hatha yoga sadhana may be included in academic curriculum.
6. Hatha yoga sadhana may be done by all the people in their daily routine for regular work.
7. The practice of yoga from early age will prevent the occurrence of the studied physiological, hormonal, and psychological disturbances.

5.4 SUGGESTIONS FOR FURTHER RESEARCH

During the course of the research study, the investigator came across a number of ideas, based on which the following suggestions are made for further research in this area.

1. Similar study can be conducted on other, physiological, biochemical and psychological variables also.
2. Similar study may be conducted for the extension period of experimentation by selecting a large sample.
3. Since the research was selected on two experimental groups, more experimental groups can be compared for preteen girls.
4. Similar study can be undertaken on different variables to find out the changes on Hatha yoga sadhana.
5. Similar study can be undertaken for girls of different age groups.
6. Similar study can be undertaken for rural and urban girls as well as women.
7. Similar study may be conducted for other health problems faced by preteen girls.
8. The present study needed to be strengthened or support by more relevant research studies.
9. Similar study can be recommended with ayurveda, naturopathy, homeopathy and siddha drugs

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APPENDIX

APPENDIX A

QUESTIONNAIRE FOR SEDENTARY BEHAVIOR

SEDENTARY BEHAVIOR QUESTIONNAIRE (SBQ)

BY James F. Sallis (2010)

On atypical, how much time do you spend (from when you wake up until you go to bed) doing the following?

S. No	Content	None	15 min. or less	30 min.	1 hr	2 hrs	3 hrs	4 hrs	5 hrs	6 hrs or more
1	Watching television (including videos on VCR/DD).									
2	Playing computer or video games									
3	Sitting listening to music on the radio, tapes or CDs.									
4	Sitting and talking on the phone									
5	Doing paperwork or computer work (office work, emails, paying bills etc.,)									
6	Sitting reading a book or magazine									
7	Playing a musical instrument									
8	Doing artwork or crafts									
9	Sitting and driving in a car, bus or train									

APPENDIX B

QUESTIONNAIRE FOR PHYSICAL ACTIVITY

PHYSICAL ACTIVITY QUESTIONNAIRE (PAQ) MANUAL

by Kowalski, K., et al. (1997)

We are trying to find out about your level of physical activity from **the last 7 days** (in the last week). This includes sports or dances that make you sweat or make your legs feel tired, or games that make you breathe hard, like tag, skipping, running, climbing, and others.

Remember:

1. There are no right and wrong answers - this is not a test.
2. Please answer all the questions as honestly and accurately as you can - this is very important.

---

1. Physical activity in your spare time: Have you done any of the following activities in the past 7 days (last week)? If yes, how many times? (Tick only one per row.)

	No	**1-2**	**3-4**	**5-6**	**7 times or more**
Aerobics					
Swimming					
Dance					
Badminton					
Volleyball					
Basketball					
Others					

2. In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)? (Check one only.)
   - I don't do PE ----------
   - Hardly ever ----------
   - Sometimes----------
   - Quite often----------
   - Always----------
3. In the last 7 days, what did you do most of the time at recess? (Check one only.)
   - Sat down (talking, reading, doing schoolwork)-----

- Stood around or walked around ----------
- Ran or played a little bit ----------
- Ran around and played quite a bit----------
- Ran and played hard most of the time----------

4. In the last 7 days, what did you normally do at lunch (besides eating lunch)? (Check one only.)
    - Sat down (talking, reading, doing schoolwork)-----
    - Stood around or walked around----------
    - Ran or played a little bit----------
    - Ran around and played quite a bit ----------
    - Ran and played hard most of the time----------
5. In the last 7 days, on how many days right after school, did you do sport, dance, or play games in which you were very active? (Check one only.)
    - None----------
    - 1 time last week ----------
    - 2 or 3 times last week----------
    - 4 times last week ----------
    - 5 times last week----------
6. In the last 7 days, on how many evenings did you do sports, dance, or play games in which you were very active? (Check one only.)
    - None ----------
    - 1 time last week----------
    - 2 or 3 times last week----------
    - 4 or 5 times last week----------
    - 6 to 7 times last week----------

7. On the last weekend, how many times did you do sports, dance, or play games in which you were very active? (Check one only.)
    - None ----------
    - 1 time----------
    - 2 - 3 times----------
    - 4 - 5 times----------
    - 6 or more times----------
8. Which one of the following describes you best for the last 7 days? Read all five statements before deciding on the one answer that describes you.
    - All or most of my free time was spent doing things that involve little physical effort----------
    - I sometimes (1- 2 times last week) did physical things in my free time---------
    - (e.g. played sports, went running, swimming, bike riding, did aerobics)--------
    - I often (3- 4 times last week) did physical things in my free time----------
    - I quite often (5- 6 times last week) did physical things in my free time---------
    - I very often (7 or more times last week) did physical things in my free time---
9. Mark how often you did physical activity (like playing sports, games, doing dance, or any other physical activity) for each day last week.

	None	Little bit	Medium	Often	Very often
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

10. Were you sick last week, or did anything prevent you from doing your normal Physical activities (Check one)
    - Yes
    - No

    If Yes, What prevented you? _____

APPENDIX C

QUESTIONNAIRE FOR FAMILY COHESION

Family Cohesion by Moos, R. H. (1974)

We are trying to find out about your level of cohesive family environment. Please answer all the questions as honestly and accurately as you can - this is very important

S. No	CONTENT	Mostly True	Mostly False
1	Family members really help and support one another.		
2	We often seem to be killing time at home.		
3	We put a lot of energy into what we do at home.		
4	There is a feeling of togetherness in our family.		
5	We rarely volunteer when something has to be done at home.		
6	Family members really back each other up.		
7	There is little group spirit in our family.		
8	We really get along well with each other.		
9	There is plenty of time and attention for everyone in our family.		

APPENDIX D

QUESTIONNAIRE FOR EATING ATTITUDE

Children's Version of the eating Attitude test by Garner et al. (1982)

Instructions: Please place an x index the word which best applies to the statement below

S. No	Content	Always	Very often	Often	Sometimes	Rarely	Never
1	I am scared about being overweight						
2	I stay away from eating when I am hunger						
3	I think about food a lot of the time						
4	I have gone on eating binges where I feel that I might not be able to stop						
5	I cut my food into small pieces						
6	I am aware of the energy (calorie) content in foods that I eat						
7	I try to stay away from foods such as breads, potatoes, and rice.						
8	I feel that others would like me to eat more						
9	I vomit after I have eaten						
10	I feel very guilty after eating						
11	I think a lot about wanting to be thinner						
12	I think about burning up energy (calories) when I exercise						
13	Other people think I am too thin						
14	I think a lot about having fat on my body						
15	I take longer than others to eat my meals						
16	I stay away from foods with sugar in them						
17	I eat diet foods						
18	I think that foods control my life						
19	I can show self control around food						
20	I feel that others pressure me to eat						
21	I give too much time and thought to food						
22	I feel uncomfortable after eating sweets						
23	I have been dieting						
24	I like my stomach to be empty						
25	I enjoy trying new rich foods						
26	I have the urge to vomit after eating						

APPENDIX E

RAW DATA FOR SEDENTARY BEHAVIOR

(Scores in Numbers)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	68	46	68	46	72	70
2	67	39	56	39	54	56
3	52	47	53	47	69	53
4	69	50	71	33	59	71
5	53	52	69	46	61	69
6	65	50	56	49	57	56
7	51	43	56	43	63	56
8	61	48	67	48	65	67
9	65	47	61	47	58	65
10	69	46	59	46	60	59

APPENDIX F

RAW DATA FOR PHYSICAL ACTIVITY

(Scores in Numbers)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	9	28	14	42	19	10
2	20	26	16	28	19	19
3	17	29	17	29	17	17
4	15	22	13	34	15	15
5	17	27	21	32	16	16
6	17	31	18	37	17	18
7	18	32	18	38	17	18
8	14	34	16	31	16	16
9	19	29	17	35	17	17
10	15	28	17	29	9	17

APPENDIX G

RAW DATA FOR FAMILY COHESION

(Scores in Numbers)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	3	5	3	7	3	3
2	4	7	2	8	2	2
3	3	6	3	6	3	3
4	2	5	4	7	4	4
5	3	6	5	9	5	5
6	4	7	4	8	4	4
7	3	6	3	7	3	3
8	4	5	2	6	1	4
9	5	6	2	7	2	3
10	3	7	3	7	3	2

APPENDIX H

RAW DATA FOR EATING ATTITUDE

(Scores in Numbers)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	46	55	34	69	27	48
2	29	57	27	58	46	32
3	34	51	43	58	29	36
4	27	59	39	64	34	34
5	29	61	36	57	46	26
6	36	59	40	61	28	29
7	45	56	26	65	29	34
8	26	45	30	58	36	27
9	29	57	36	69	33	43
10	34	57	29	65	30	30

APPENDIX I

RAW DATA FOR DEHYDROEPIANDROSTERONE (DHEA)

(Scores in ug/dl)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	146	170	149	177	146	148
2	145	168	145	186	151	159
3	149	170	145	179	150	149
4	150	163	147	173	147	149
5	152	179	150	186	146	146
6	146	168	146	171	148	152
7	151	182	148	185	149	147
8	148	176	147	185	145	149
9	149	172	151	189	145	145
10	147	186	146	173	146	147

APPENDIX J

RAW DATA FOR LUTEINIZING HORMONE (LH)

(Scores in IU/L)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	8.6	7.2	8.3	6.9	8	7.8
2	8.1	7.1	7.9	6.4	7.9	7.5
3	8.5	7.6	8.4	7.6	8.1	8.2
4	7.4	6.4	7.4	6.1	8.2	7.9
5	8.2	7.2	8	7.3	8.2	8
6	7.9	7.1	7.8	6.8	8	7.9
7	8.5	7.7	8.2	7.2	8.4	8
8	8.4	7.1	8	7.4	7.8	7.9
9	7.9	7.2	8.1	7	7.7	7.5
10	7.9	6.9	7.9	6.4	8.1	7.8

APPENDIX K

RAW DATA FOR GONADOTROPHIN RELEASING HORMONE (GnRH)

(Scores in IU/l)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	1.3	2	1.7	2.6	1.1	1.2
2	1.6	2.3	1.6	2	1.6	1.6
3	1.2	2	2	2.8	1.3	1.5
4	1.5	1.8	1.2	2	1.1	1.3
5	1.7	2.4	1.4	2.1	1.5	1.4
6	1.1	1.6	1.1	1.9	1.5	1.5
7	1.2	1.9	1.5	2.3	1.7	1.4
8	1.3	2.2	1.3	2.2	1.6	1.3
9	1.4	2.6	1.1	2	1.3	1.9
10	1.4	2.4	1.9	2.6	1.4	1.6

APPENDIX L

RAW DATA FOR FOLLICLE STIMULATING HORMONE (FSH)

(Scores in mIU/ml)

S.No	Static Hatha Yoga Sadhana Group		Dynamic Hatha Yoga Sadhana Group		Control Group	
	Pre test	Post test	Pre test	Post test	Pre test	Post test
1	9.4	8.3	8.4	6.4	7.9	8
2	8.4	7.1	8.9	6.1	8.5	8.1
3	8.6	8	8.1	5.9	9.1	9.5
4	7.8	7.1	7.6	5.7	8.4	8.1
5	7.6	6.6	9.1	7.4	10	9.6
6	9.1	8	9.5	7.2	9.4	9.2
7	9.6	8.6	8.9	5.4	8.6	8.5
8	8.8	7	9.4	7.1	8.1	9.1
9	8.6	7.4	8.6	6.8	9.2	8.4
10	9.7	9	10	8.8	9.9	9.4

APPENDIX M

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EFFECT OF STATIC AND DYNAMIC HATHA YOGA SADHANA ON FAMILY HISTORY AMONG PRETEEN GIRLS

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ABSTRACT

The purpose of the present study was to find out effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development among preteen girls. The study was conducted on 30 preteen girls. Totally three groups, namely Group I as Static Hatha Yoga Sadhana, Group II as Dynamic Hatha Yoga Sadhana, Group III as Control group consisting of 10 preteen girls underwent 15 weeks practice in Static Hatha Yoga Sadhana, Dynamic Hatha Yoga Sadhana and whereas the control group did not under go any type of training. The Family History was measured before and after the experimentation using the standardized questionnaire to measure the family history. The data were analyzed by Analysis of Covariance (ANCOVA) and it was concluded that the Static Hatha Yoga Sadhana, Dynamic Hatha Yoga Sadhana had significant ($P < 0.05$) effect on the family history.

Key words: Static & Dynamic, Hatha Yoga Sadhana, Family history, Pre-teenage

INTRODUCTION

Puberty refers to the transition in life from being a girl into becoming a woman. It marks the inception of sexual maturity and a body, which is capable of reproduction, marked by changes like breast development and menstruation. Girls attain reproductive maturity four years after the first physical changes of puberty appear. Between the ages of 9 and 12 most boys and girls begin to notice changes taking place in their bodies. These changes, which occur over a number of years, are generally referred to as puberty.

The changes take place in all boys and girls but they will start at different times and take place at different rates. Not everyone starts puberty between the ages of 9 and 12, some people start younger, and some much later. Similarly, in some people, all the changes take place in two years, and in others, they can take as long as four years. Generally they start between ages 7 and 13 in girls and ages 9 and 15 in boys.

Puberty starts when extra amounts of chemicals called hormones start to be produced in the body. These hormones guide the changes that take place in the body. As well as causing physical changes these hormones also cause emotional changes. Puberty starts when extra amounts of chemicals called hormones are produced in the body. In girls, a hormone called estrogen guides the changes that take place in the body.

Yoga is an ancient Indian practice that aims at rehabilitating and reinforcing a balance between the body, mind, and spirit. Used as a complementary practice alongside allopathic treatment, it can help individual's cope and live with muscular dystrophy. Incorporating Static and Dynamics of yoga practices can help ease the conditions of muscular dystrophy and greatly improve the quality of life. Muscular dystrophy yoga uses a series of gentle and easy movements in combination with deep breathing techniques to improve muscle tone and reduce pain.

STATEMENT OF THE PROBLEM

The purpose of this research is to find out the effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development among preteen girls.

METHODOLOGY

The purpose of the study was to find out the effect of static and dynamic hatha yoga sadhana on selected socio environmental and pubertal development among preteen girls. For the purpose of this study, thirty preteen girls were chosen on random basis from Chennai only. Their age group ranges from 9 to 12 years. The subjects were divided into three group of ten each. The Group I – underwent Static Hatha Yoga Sadhana, Group II - underwent Dynamic Hatha Yoga Sadhana and Group III - Control group did not undergo any yogic training, and the pre test and post tests would be conducted before and after the training. The training was given for 15 weeks. It was found out finally the effect of Static hatha yogic sadhana and Dynamic hatha yogic sadhana on family history among pre teen girls in scientific method. To estimate the family history standard questionnaire was used. The collected data were statistically analyzed by using analysis of covariance (ANCOVA).

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Table - I Training Schedule

Group I: Static Hatha Yoga Sadhana	Group II: Dynamic Hatha Yoga Sadhana	Group III: Control Group
1. Mantra chanting 2. Pavanamuktasana: I 3. Utkatasana 4. Trikonasana 5. Ardha chakrasana 6. Ekapadasana 7. Halasana 8. Bujangasana 9. Salabhasana 10. Dhanurasana 11. Santhisana 12. Pranayama 13. Yoga nidra	1. Mantra chanting 2. Suryanamaskar 3. Chandranamaskar 4. Yoga nidra 5. Pranayama	(No Practice).

RESULTS

The statistical analysis comparing initial and final means of family history due to Static and Dynamic Hatha Yoga Sadhana among pre teen girls is presented in Table II.

Table - II Computation of Analysis of Covariance of Pre-Test, Post-Test And Adjusted Post-Test on Family History of Static Hatha Yogic Sadhana and Dynamic Hatha Yogic Sadhana Among Pre Teen Girls

	Static Hatha Yogic Sadhana	*Dynamic Hatha Yogic Sadhana*	*Control Group*	*Source of Variance*	*Sum of Squares*	*df*	*Mean Squares*	*Obtained F*
Pre Test Mean	*3.4*	*3.1*	*3*	*Between* *Within*	*0.86* *27.3*	*2* *27*	*0.43* *1.01*	*0.43*
Post Test Mean	*6*	*7.2*	*3.3*	*Between* *Within*	*79.8* *21.7*	*2* *27*	*39.9* *0.80*	***49.65****
Adjusted Post Test	*5.8*	*7.2*	*3.37*	*Between* *Within*	*76.37* *16.6*	*2* *26*	*38.18* *0.64*	***59.81****
Mean Gain	*2.6*	*4.1*	*0.3*					

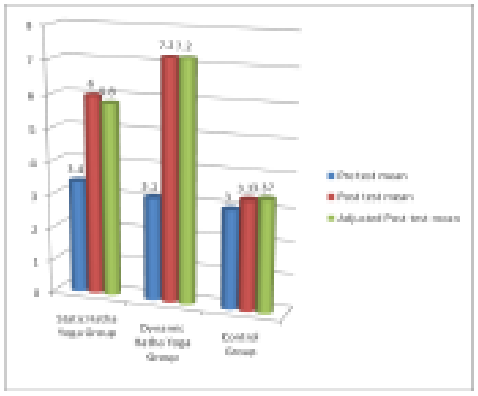
*Table value Significant at 0.05 level of confidence for 2 and 27 (df) is.3.35, 2 and 26 (df) is 3.37.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table III.

Table- III Ordered Adjusted Family History Means, Differences Between Means and Scheffe's Post-Hoc Test F-Ratio of Control Groups, Static Hatha Yogic Sadhana and Dynamic Hatha Yogic Sadhana

Static Hatha Yogic Sadhana	*Dynamic Hatha Yogic Sadhana*	*Control Group*	Mean Difference	CI
5.90	–	3.37	2.53*	0.93
–	7.23	3.37	3.86*	
5.90	7.23	–	1.33	

Figure - I Bar Diagram on Ordered Adjusted Means of Family History



DISCUSSION

Hence, taking into consideration of the pre test means, post test means and adjusted post test means were determined and analysis of covariance was done and the obtained F value 59.81 was greater than the required value of 3.37 and hence it was accepted that the static hatha yogic sadhana and dynamic hatha yogic sadhana significantly improved the family history of the pre teen girls.

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between static hatha yogic sadhana and control group; and dynamic hatha yogic sadhana and control group on family history. This study proved that due to fifteen weeks of static and dynamic hatha yogic sadhana of family history was significantly improved among pre teen girls.

The analysis of co-variance of family history indicated that Group I - Static hatha yogic sadhana, Group II - Dynamic hatha yogic sadhana and Group III - Control group were significantly difference on the family history. It may be due to the effect of static hatha yogic sadhana and dynamic hatha yogic sadhana. The findings of the study showed that the group II (Dynamic hatha yogic sadhana) had improved (increase) family history more than the group I (Static hatha yogic sadhana). Nearly everything in life requires balance. Hatha Yoga Sadhana on its own is a good step toward a healthy life style. However, as individual, it is important to malaise that we need to work on our body as well as our mind. We can use Hatha Yoga Sadhana not only as part of a program to improve (increase) family history, but also as a way to assist in attaining other goals.

CONCLUSION

This study proved that due to fifteen weeks of static and dynamic hatha yogic sadhana of family history was significantly improved among pre teen girls.

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