

Chapter-I

INTRODUCTION

1.1.Diabetics

The total world population of diabetics as per the statistical data available is 17 crore and out of that 6.22 crore, more than 1/3 of the total diabetics, belong to India. The WHO predicts that in 2020 there will be an diabetic epidemic in India. Diabetics is afflicting the people of India at a very rapid rate. The Administrator cited the sedentary lifestyle of the residents as a major cause for increasing number of diabetes cases. The invading Western lifestyle from cities to towns and bigger villages, less physical activity and consumption of high-energy foods, alcohol and smoking were contributing to the increase in the number of diabetics. Giving a call to accelerate research to make the treatment of diabetes and other hormonal disorders less costly, Justice Verma said to provide treatment to the rural population it was necessary to make it more economic.

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia arising as a result of a relative or absolute deficiency of Insulin secretion, resistance to insulin action, or both. Diabetes is an ailment in which the body does not produce or properly use insulin. Insulin is a regulatory hormone required for energy management. The cause of diabetes continues to be anonymity, although both genetics and environmental factors such as obesity and lack of exercise appear to play roles. Diabetes mellitus is a major and growing public health problem throughout the world, with an expected to 220 million people by 2010 (**Melander, et al., 1989**). Approximately

10% of patients have type 1 diabetes mellitus (DM), and the remainder have type 2 DM (**Attele, et al., 2002**). Recent estimates project that the number of patients diagnosed with Type II diabetes will more than double to 300 million before 2025. Once found primarily in middle-aged adults hence the terminology —adult onset diabetes, the disease is now being observed with increasing frequency in young children and adolescents. This group of patients has been reported to suffer from an increased risk of cardiovascular disease, similar to that observed in adults.

Regardless of the type of diabetes, patients are required to control their blood glucose levels with medications and/or by adhering to an exercise program and a dietary plan. Insulin therapy by injection is given to those with type 1 DM and to some patients with type 2 DM. Patients with type 2 DM are usually placed on a restricted diet and are instructed to exercise, the purpose of which primarily is weight control. If diet and exercise fail to lower and stabilize blood glucose levels, oral antidiabetic medication is prescribed. In some cases, insulin injections are necessary. These treatments are associated with adverse effects, and some may produce toxic effects (e.g., thiazolidinediones may cause liver toxicity) (**Dey, et al.,2002**). Blood glucose monitoring is an essential task for patients suffering from diabetes; thus, any change caused by herbal products to blood glucose levels may alter the amount of medication needed to control blood glucose. Medical science cannot claim that it knows all that needs to be known about this disease, including its management. This is the main reason for the persistent interest all over the world to explore alternative remedies from the so-called "alternative systems" of medicine.

1.2.Yoga Therapy

Yoga originated in northern India more than 5,000 years ago. Archeologists have found statuettes of men in yoga pose that are estimated to be 5,000 years old. Developed by the ancient sages of India, yoga was not written down for many thousands of years, but instead passed down from teacher to student. Approximately 2,000 years ago, a philosopher named Patanjali began to organize and write down the principles of yoga. Patanjali's collection of yoga's principle is known as "Yoga Sutra's". Many people consider Patanjali to be the father of yoga. **(Maran, 2003)**

1.3.Types & Benefits of Yoga

There are four Yoga, viz., Karma yoga, Bakthi yoga, Raja yoga, and Jnana yoga. Karma is suitable for people of active temperament, Bakthi yoga for people of devotional temperament, Raja yoga for men of mystic temperament with bold understanding and strong will-power. Bakthi yoga is suitable for vast majority of people as they are emotional. Jnana yoga is suitable for a microscopic minority only. Ladies can realize God quickly as their hearts are filled with devotion, Prema and affection. But it is very difficult for them to get Vairagya. **(Sri Swami Sivananda, 2000)**

Yoga Therapy is the adaptation of Yoga practices for people with health problems. Specific regimes combining gentle physical movement, conscious breathing exercises, relaxation and meditation are tailored to suit individual needs. Personal health problems are fully taken into consideration. Yoga as a therapy for diseases take a holistic approach working on many levels- physical, emotional, mental, spiritual etc. Illness

disturbs the body's natural balance. Yoga therapy enables the body to restore this balance and helps re-establish a deep sense of personal well being. **(Jim Cheek, 2006)**

Yoga, a Vedic science has been applied in the field of therapeutics in modern times. Yoga has given patients the hope to reduce medication besides slowing the progression of the disease. Yoga employs stable postures or asana and breath control or pranayama. It has already proven its mettle in the improvement of oxidative stress as well as in improving the glycaemic status of diabetics through neuro endocrinal mechanism. **(Yadav, et al., 2005)**

Pratyahara should be aided by quiet breathing. When all are agitated our breathing is fast and jerky, but if we breathe quietly and evenly tranquility of mind is promoted. Oxygen is the vital fuel of life. It powers all human activity, from the metabolism of a single cell to the contraction of a muscle. Breathing is the activity that takes oxygen into the body from the air- in rough terms, 20 percent of air is made up of oxygen and 80 percent of nitrogen- and expels carbon dioxide, which is the waste product produced by the use of oxygen. And since the body does not store oxygen, with the exception of a small amount that is held in the muscle, its supply must be continuous. As we inhale, air is sucked into the lungs, where it passes through tubes of descending size- the trachea, bronchi, and bronchiole- until it reaches tiny sacs called alveoli. **(Sunder, 2009)**

Yoga is an ancient form of relaxation and exercise that has many healthy benefits, including lowering cholesterol. Pranayama also helps to connect the body to its battery, the solar plexus, where tremendous potential energy is stored. When tapped

through specific techniques this vital energy, or prana, is released for physical, mental and spiritual rejuvenation. Regular practice removes obstructions, which impede the flow of vital energy. When the cells work in unison, they bring back harmony and health to the system. 20 to 25 minutes (every morning or evening) of pranayama practice increases lung capacity, breathing efficiency, circulation, cardiovascular efficiency, helps to normalize blood pressure, strengthens and tones the nervous system, combats anxiety and depression, improves sleep, digestion and excretory functions, provides massage to the internal organs, stimulates the glands, enhances endocrine functions, normalizes body weight, provides great conditioning for weight loss, improves skin tone and complexion. **(Sugumar and Raghavan, 2010)**

1.4.Yoga and Lipid Profiles

The dynamic series known as surya namaskara (salutation to the sun) is most important for the treatment of obesity. Surya namaskara is a complete practice in itself because it includes asana, pranayama, mantra and meditation. This practice has a unique influence on the endocrine and nervous system, helping to correct metabolic imbalances that cause and perpetuate obesity. Being a dynamic practice, it is also an excellent exercise equated to cycling, jogging or swimming. There are several fairly obvious physical factors in the yogic lifestyle that would influence health and aging, as well as more subtle factors. Calorie restriction (CR) is widely accepted as the only method so far proven to extend longevity and reduce the physical manifestations of aging. It has been demonstrated in a wide variety of species, from yeast to monkeys (though not yet in humans), that a calorie restricted diet (lowering the calorie intake by 20-30%, while providing essential nutrients), increases lifespan. CR animals maintained youthful

appearances and activity levels longer and showed delays in a range of age-related diseases. CR reduces age associated neuronal loss, prevents age-associated declines in learning, psychomotor and spatial memory tasks and improves the brain's ability for self repair. We can find several parallels between the effects of calorie restriction and the metabolic effects associated with yoga practice. (**Koubova and Guarente, 2003**)

Biochemical advantages of yoga: lessens in amount of glucose, sodium, cholesterol, triglycerides, catecholamines, total white blood cell count, boosts the level of cholinesterase, ATPase, hemoglobin, hematocrit, lymphocyte count, vitamin C, thyroxin, total serum protein (**Harshika, Nov, 2010**). Comprehensive studies done on large populations in the past 15 years have proved that reducing cholesterol and keeping the blood pressure under check can significantly reduce coronary artery diseases. There was a time when a total cholesterol level of 240 mg was considered normal. But by 1986 itself, the threshold was fixed at 200 mg. In recent times, though the threshold for total cholesterol has remained at 200 mg, the cut-off point for LDL or bad cholesterol has been lowered to 75 mg (**Howard, Nov, 2010**).

1.5.Varma Therapy

"மர்மமென்றும் வாசியென்றும் புரவியென்றும்
காற்றென்றும் உயிரென்றும் மாய்கை என்றும்
பிராணன் என்றும் கலை என்றும் சுவாசம் என்றும்
சரமென்றும் யோகம் என்றும் பரமென்றும்
சிவமென்றும் இத்தெயல்வாம் வர்மம் என்றும் சொல்லலாகும்".

(வாகட நிதானம் 350. பர. 30)

Varmalogy is a systematic study of vital points (varmams) on human body and also on animal bodies. The vital points (varmams) are located on nerves, nerve joints, bones, muscles, ligaments and internal organs. Right or wrong vibration of the vital points (varmams) will either promote or impair health. Varmams are rhythmically tuned by varma experts for curing various diseases like nerve disorders, arthritis, back pain, diabetes, spinal problems and etc. Varmalogy is connected with various disciplines like Siddha medicine, Yoga, Therapeutic Massage, Astrology, Psychology, Sociology, Martial Arts and so on. Now a days, this art is being practiced in two ways. Medical Varmalogy (Pressure points, Therapeutic Massage, Herbal Medicines) and Defense Varmalogy (Kalari / Kalaripayattu). Though Varma Kalai has its own form of katas and procedures, it was closely assorted with Silambam's component kuttu varisai and Kalaripayattu. Knowledge of Varma Kalai was considered vital in both arts to become a Grand Master. The teachers were called as Aasan and the grand masters were called as Periyaasan or Iyan. Medical varmalongy is essential for controlling diabetics.

1.6.History of Varma Therapy

Historically, Varma Kalai has been one of the arts taught to those of royal blood. However, even royalty were required to pass the stringent requirements for discipleship. The schools received nivandhanams (donation with high respect) from the Kings of Tamil Kingdom namely Chera, Chola, Pandya and Pallva. The art was taught only to selected individuals, but due to the strict requirements for new students it never gained large numbers of adherents. Due to its secretive nature, Varma Kalai remained largely unknown even in India until the release of the movie India, in which Kamal

Haasan played the role of a Varma Kalai expert. The film's popularity generated a resurgence of interest in the art. Currently Varma Kalai is practised in Tamil Nadu and Kerala, usually as part of Kuttu varisai and Kalari training(Stevens, 2009).

Varma Kalai teachers are highly selective in their choice of students. Disciples must meet a number of criteria; beyond martial arts competence they are required to have an understanding of biology, mathematics, political science, astronomy, physics, chemistry, Saamuthruga Lakshanam, Yoga, military tactics, horsemanship, elephant riding, charioteering and Hindu philosophy (Saiva, Vaisnava, Saktha, Koumara, Boutha, Samana) etc. The Varma Kalai martial artist is not allowed to teach the art to others until he receives Deeksha from his Aasan or Periyaasan as in recognition of him as an Aasan. Varmakalai (the art of varmam) is considered to be very auspicious. It is believed that Lord Siva taught this art form. Indians overwhelm by saying that all rare art forms originate with roots from God. For example, epics illustrate that Tamil and Sanskrit have their origin from the sound of the 'Oodukkai' (musical instrument in the hand of Lord Siva). Bharatha Naatiyam (the traditional dance) originated from Lord Siva. Kama Sutra (the art of love and sex) originated from Lord Siva. So it is of no surprise when it is said that varmakalai, the rare art that saves humans from diseases, also originated from Lord Siva.

"தேறவே சிவன் உமைக்குச் சொன்ன போதம்
ஆறாமல் நான் அறிந்து இருநால் சொள்ளேன்"
(ஓடிமுறிவு சரகுத்திரம் 1500. பா.833)

According to the above versus, Lord Siva taught varmam to his wife Parvathi; later Parvathi taught varmam to their son Lord Murugan. Lord Murugan then taught

Siddha Agasthiyar. Agasthiyar later gave a written form that reached the masses. But the original texts (and their copies), directly written by siddhas, are not available now. Saints who have grasped the meaning of the siddhas sayings have given a poetic form, which is used in modern day learning. So far, around fifty thousand (50,000) songs are available. The narrated history has been mentioned in the 41st prose of " Kai Mathirai Thiravukol " as follows:

"பண்பாக அகத்தியனார். ராமதேவர்
பணிவாக டேபாகமுனிவர் தானும்
பருவமாய் மனிதர்கள் பிழைக்கவென்று
பாங்காகச் சொன்னதொரு நூல்கள் கண்டு
பார்த்திடவே சுருக்கமாய் பிரித்துச் சொன்னேன்"

The above narration cannot be merely considered as a made-up story. One of the names that denote varmam is 'Siva'. Another name that denote varmam is 'Vasi', which means air. If you repeat 'vasi' continuously, you can hear 'Siva'. 'Sivam' means life. That is why Thirumoolar preached the philosophy of 'Love is Sivam' (Love is Life). One of the current available texts 'Sarasuthram' gives the criteria for teaching varmam to eligible students.

"ஈவது தான் யாருக்கென்றால்
சிவயோகிக்கு தான்" (பா. 4)

It says that a varmam teacher should teach varmam only to a 'sivayogi'. Sivayogi is the one who loves all life forms. In all the varmam texts written since Thirumoolar till ones in 18th - 19th century, varmam is spoken along with sivam. The history that is said so far has been taken from epics. In reality, varmakalai might have its roots in self-defense martial arts. It is the tactics man might have learnt by observing

birds and animals. In Kalari (Defense Varmalogy), practiced in southern Tamil Nadu and Kerala, various forms like Elephant Form, Tiger Form, Fox Form, Lion Form, Hanuman Form, and etc. are still in use. In cockfight, to improve the fighting spirit, the owner of the cock will massage the back of the cock. This looks similar to how now a days the teacher gives a pat on the student's shoulder to encourage him or her. To protect oneself from the enemies, man invented the art of self-defense. Each country has its own indigenous form of martial arts. Kalaripayattu, Naatu Murai, Kuthu Varisai, and Malyutham are some amongst the vast martial arts of Indian origin. In Indian martial art Kalaripayattu, there are not only techniques for self-defense, but there are also techniques to collapse the enemy by attacking on the varmam points. Kalaripayattu is divided into two schools namely:

1. Therkan Kalaripayattu (Southern Kalaripayattu)

2. Vadakkan Kalaripayattu (Northern Kalaripayattu)

Vadakkan Kalaripayattu gives importance to weapons training where as Therkan Kalaripayattu gives importance to hand to hand combat techniques. One should never strike a varmam points using knife or sword. Instead, one can damage a varmam point by striking with hand or by a stick. Such techniques are numerous in the Therkan Kalaripayattu. The following are various forms available in Therkan Kalaripayattu namely Nilaiyangam (technique of blocking the attacks without moving from where you stand), Piriayangam, Mariyangam, China Suvadu, China Silath, Ethiradavu, Jodi Murai, Kurunthadi (Short stick), Nedunthadi (Long stick), Sirama Varisai, Ayutha Varisai, Suvadu Nilai (Angam 64), Kattu Varisai, Nadasari Murai (Savittu Murai),

Poottum Pirivum, Olivu Murai, Perruka Murai (Anchettu Perrukam, Naalettu Perrukam) and Munda Varisai. Of the above 18 forms, specifically Angam 64, Perruka Murai, Siraman Varisai and Olivu Murai work in tandem with varmalogy. The Angam 64 form is about making steps within 8 feet circumference and attacking 64 varmam points on the opponent's body and make him immobile. This form is one of the toughest to master. Similarly Siramam Varisai consists of having sticks of 3/4th feet length in both hands and using them to strike the varmam points on the opponent's body. Usually masters teach this form by combining song, music and dance movements. . Varma is the seat of wind, breath or sources/seat of life. when the flow of this life-force is disturbed the body becomes insensitive. If the injury is of very servious kind it moves. If the injury or damage intensity and it is not yet too late for treatment recovery is possible (**Aug, 2012, <http://www.varmam.org/>**).

1.7. Techniques of Varma Therapy

According to **Stevens, 2009**, Varma kalai is classified into four types namely thodu varmam (96), padu varmam (12), thattu varmam and nooku varmam. In human body there are 108 Varmam's (Vital points) they are: vital points part of human body.

Vital points	Part of human body
25	From head to neck
45	From neck to navel
9	From navel to arm
14	Arms

15	Legs
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According to Vaidhiya murai (Healing therapy under Siddha medicine) the vital points are explained as:

Vital points	Functions
64	Vadha varmam
24	Pitha varmam
6	Kaba varmam
6	Ul varmam
8	Thattu varmam

1.8.Varmam and Yoga

Yoga is classified into two main streams. One based on breathing; and another based on body postures. They work in tandem and culminate to form today's yoga. If yoga asanas (yoga postures) are properly practiced, it will result in good health. The basic reason for that is yoga asanas properly tunes the nerves system (along with varmam points present in the nerves system), resulting in regulated blood flow throughout the body. Every yoga asanas has its effect on certain group of varma points enabling proper health, flexibility, mobility and physique. For example, if you consider Padmasana (one yoga posture), it produces mild pressure on these varmam points: Viruthi varmam, Kanpugaichal varmam, Ullthodai varmam, and Mulaathara varmam. Because of that, Iddakala (Left) and Pingala (Right) nerves gets tuned and strengthens

the vertebral column. It increases concentration, memory, serenity on one's face, and etc.

1.9.Varmam and Astronomy

Rays from all the planets and moons in the solar system reaches Earth. They are responsible for health and illness amongst the living beings. Siddhas, who developed varmalogy, studied where and when these rays act on human body and based on their studies, they have created various varmam texts which studies varmam points in relationship with the rays from the planets and moons and their consequence on human body. Such studies are taught only through guru-sishya (teacher-student) heritage. Such studies can be used to stop occurrence of heart diseases and kidney diseases. Even the diseases that are present can be systematically cured. Varmam's relation with other fields like Psychology, Tantra, Anka Sasthra, Philosophy, Kama Sastra, etc (**Aug, 2012, <http://www.varmam.org/>**).

The understanding of the various training methodology among the physical education professionals may not be sufficient enough to use the principles in the actual training process. After studying the above therapeutical concepts the scholar has concluded that modifications in the trainings will help for enhancing physiological, bio-chemical and psychological parameters. Hence, the scholar made an attempt to find out the effect of varma and yoga therapy on selected Physiological, Bio-chemical and Psychological variables of diabetic patients. Tons of people on bettering their health and lead a healthy life with yoga by stretching the main muscle or muscle groups.

1.10. Objectives of the study

The following are the specific objectives of this study.

1. To find out the effect of varma therapy and yoga therapy on selected Physiological variables such as Resting pulse rate and Blood Pressure of diabetic patients.
2. To establish the effects of varma therapy and yoga therapy on selected Biochemical variables such as Total cholesterol and Blood glucose of diabetic patients.
3. To find out the effects of varma therapy and yoga therapy on selected Psychological variables such as Stress and self-confidence of diabetic patients.

1.11. Statement of the problem

The purpose of the study was to find out the effect of varma therapy and yoga therapy on selected Physiological, Bio-chemical and Psychological variables of diabetic patients.

1.12. Hypotheses

The researcher reviewed the available literature and also based on the above criteria, the following hypotheses were formulated and tested at 0.05 level of significance.

It was hypothesized that

1. There would be significant improvement on the selected physiological, bio-chemical and psychological variables due to the effect of varma therapy and yoga therapy than the control group.
2. There would be significant difference on the selected physiological, bio-chemical and psychological variables between the experimental groups.

1.13. Significance of the study

The results of the study may be useful to the following ways.

1. The findings of the study may add to the existing source of knowledge with regard to yoga and varma among diabetic patients on selected physiological, bio-chemical and psychological variables.
2. The findings of this study may also help the doctors/coaches/trainers to identify the appropriate method among the two types namely, varma and yoga therapy, to improve the physiological, psychological variables and maintain level of lipid profile and blood glucose level and at the outset, the total well-being of not only diabetics but also the other human beings.
3. It would further add to the quantum of knowledge in the areas of varma therapy, psychology and bio-chemistry.
4. The study may help physical educators to conduct further research in this area.
5. This study gives an additional knowledge to the area of research.

1.14. Delimitations

1. To achieve the purpose of the study, 90 male diabetic patients only were selected from Chennai city, at random and their age ranged from 40 – 55 years only.

2. Selected subjects were divided into three equal groups namely experimental group I (VTG=30) underwent varma therapy, Group II (YTG=30) underwent yoga therapy, Group III served as control (CG=30).
3. The independent variables were yoga therapy and varma therapy only.
4. The following dependent variables were selected for this study, physiological variables namely resting pulse rate and blood pressure; biochemical variables namely total cholesterol and blood glucose; and psychological variables namely stress and self-confidence only.
5. The duration of the training period was restricted to twelve weeks and the number of sessions per week was confined to six, an hour maximum per day in the morning.
6. The level of significance was fixed at 0.05 level, which was considered to be appropriate.

1.15. Limitations

1. Heredity and environmental factors which may influence the results of this study could not be controlled or assessed.
2. Subject's body type and the socio economic status are not taken into consideration for this study.
3. Subjects included in the study may not be controlled with regard to their life style, diet, medication and habits which may have influenced their performance.

1.16. Meaning and Definition of the Terms

1.16.1 Varma

Varma kalai is a martial art and esoteric healing art originating from ancient Tamil Nadu in South India. The name literally translates as "The Art of Vital Points". It is an element of the Tamil martial art kuttu varisai (Stevens, 2009).

1.16.2.Yoga

‘Asanas’ one of Yoga’s most significant ‘tools’ helps in the positioning of the body in various postures with the total involvement of the mind and self in order to establish communication between our external and internal selves (Iyengar,2001).

1.16.3 Varma Therapy

In the current study, the varma therapy during supervised sessions was the various types of varma techniques were practiced. During unsupervised sessions, the varma therapy could have included stretching and rotation exercise.

1.16.4. Yoga Therapy

In the current study, the yogic practice during supervised sessions was the various types of asanas were practiced. During unsupervised sessions, the yogic practice could have included stretching and rotation exercise.

1.16.5.Physiology

It applies the concept of exercise physiology (exercise physiology is the study of how our bodies structure and function altered when we are exposed to acute and chronic bouts of exercise) to training the athlete and enhancing the athlete’s sport performance. (Wilmore and Costill, 1994).

1.16.6.Resting Pulse Rate

The beat of the heart felt through the walls of the arteries is known as pulse. It is felt when the fingers are laid upon the radial artery at the wrist (**Miller, 1965**).

1.16.7. Blood Pressure

It is defined as the lateral pressure exerted by blood on blood vessels. The blood pressure, which normally expresses is arterial blood pressure. It has two phases.

1.16.8. Systolic Blood Pressure

Systolic blood pressure is the maximum blood pressure. This occurs during the systole of the heart.

1.16.9. Diastolic Blood Pressure

Diastolic blood pressure is the minimum blood pressure. It occurs during the diastole of the heart (**Wilmore and Costill, 1994**).

1.16.10. Total Cholesterol

The total cholesterol is defined as the sum of HDL, LDL and VLDL.

Cholesterol is sterol, a lipid found in the cell membranes of all body tissues, and is transported in the blood plasma of all animals. Because cholesterol is synthesized by all eukaryotes, trace amounts of cholesterol are also found in membranes of plants and fungi.

1.16.11. Blood Glucose

Blood glucose is the primary source of energy for the body's cells, and blood lipids (in the form of fats and oils) are primarily a compact energy store. Glucose is

transported from the intestines or liver to body cells via the bloodstream, and is made available for cell absorption via the hormone insulin, produced by the body primarily in the pancreas. Blood glucose levels are usually lowest in the morning, before the first meal of the day (termed "the fasting level"), and rise after meals for an hour or two by a few milliMolar.

1.16.12.Psychophysiology

The branch of physiology dealing with the relationship between physiological processes and thoughts, emotions, and behaviour.

1.16.13.Stress

It is a biological term which refers to the consequences of the failure of a human or animal body to respond appropriately to emotional or physical threats to the organism, whether actual or imagined.

1.16.14.Self-confidence

Promise yourself, no matter how difficult the problem life throws at you, that you will try as hard as you can to help yourself. You acknowledge that sometimes your efforts to help yourself may not result in success, as often being properly rewarded is not in your control. (**Persaud, 2005**).